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Mechanical Foundry Minimizes Labor

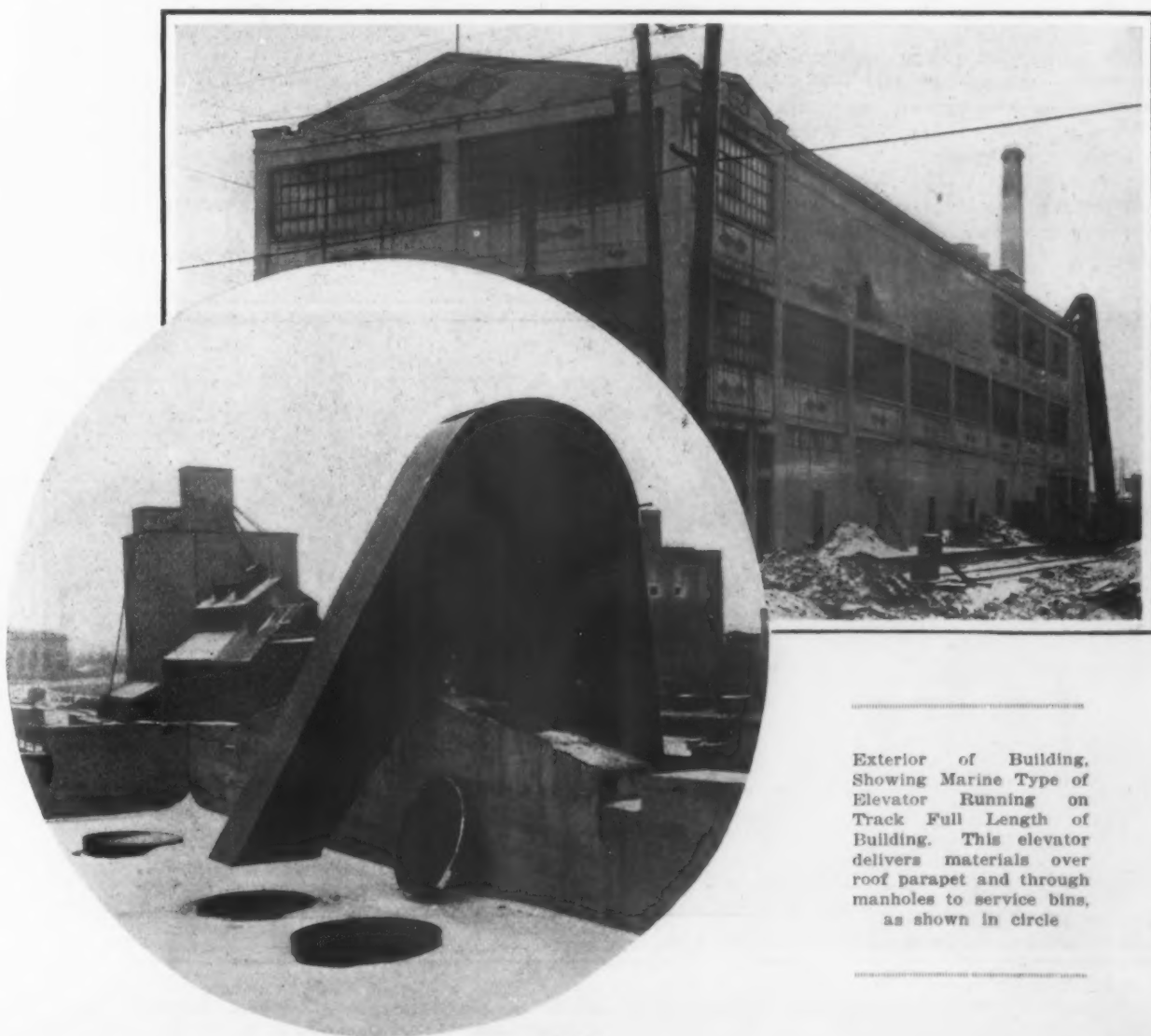
Output Per Man Trebled in New Plant of Lavelle Foundry Co.—
Three Stories, Gravity Flow, Controlled Conveyors and
Specialized Designs All Contribute

BY J. E. MC DONALD

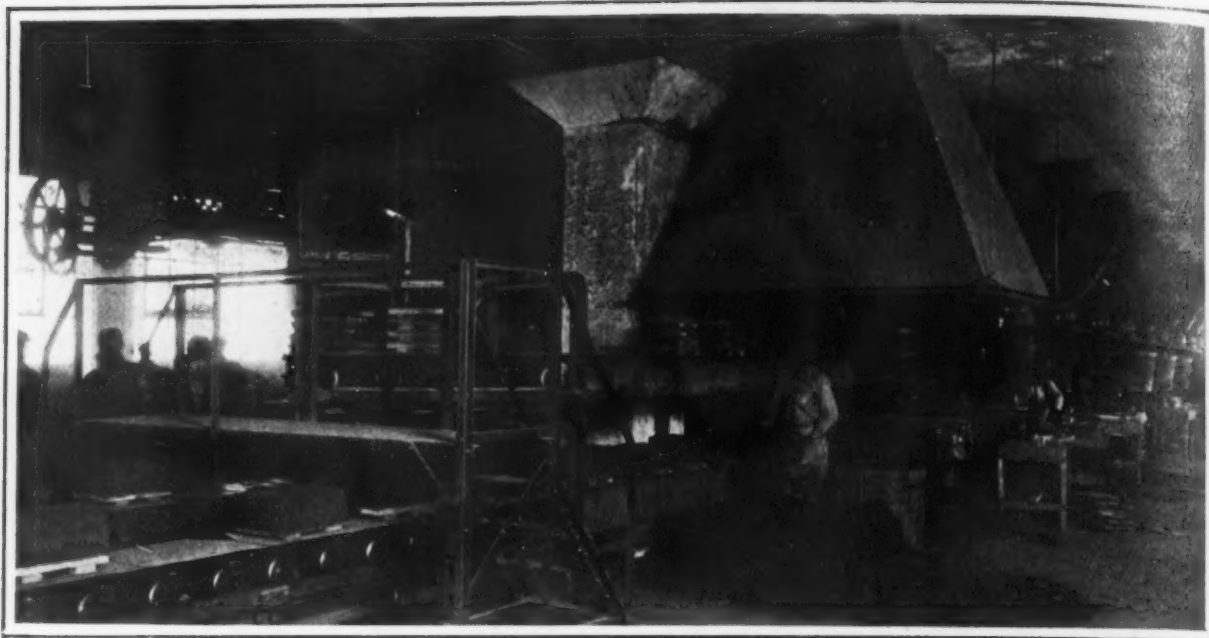
A MECHANICAL foundry, with the elimination of the human element as far as possible, has long been the goal of designers, and some progress has been made in recent years along this line. Among foundrymen, substitution of manual labor by mechanical means has also been given much attention, and here, too, progress has been noted. Designers of foundry equipment have also done their share to eliminate many

of the arduous tasks of the workers in the foundries of the country. How far this progression has advanced may be gleaned from a description of the new Indianapolis foundry of the Lavelle Foundry Co. of Anderson, Ind.

This foundry is the result of a vision of the officials of the company. Despite many obstacles, these men clung tenaciously to their theory of a mechanical foundry.



Exterior of Building, Showing Marine Type of Elevator Running on Track Full Length of Building. This elevator delivers materials over roof parapet and through manholes to service bins, as shown in circle



At the Dumping Station Molds Are Dumped Into the Chutes, and the Bottom Boards Placed on the Upper Conveyor for Return to Molding Benches. Note crossover bridge for workmen's convenience in moving about the shop

dry. Their ideas of what should be done were discouraged by designers and foundrymen alike, but still they clung to them. Visits were made to almost every foundry in the country to see what improvements were being made, and to find, if possible, a foundryman with the necessary qualifications for taking hold of the idea, and putting it through to a successful termination.

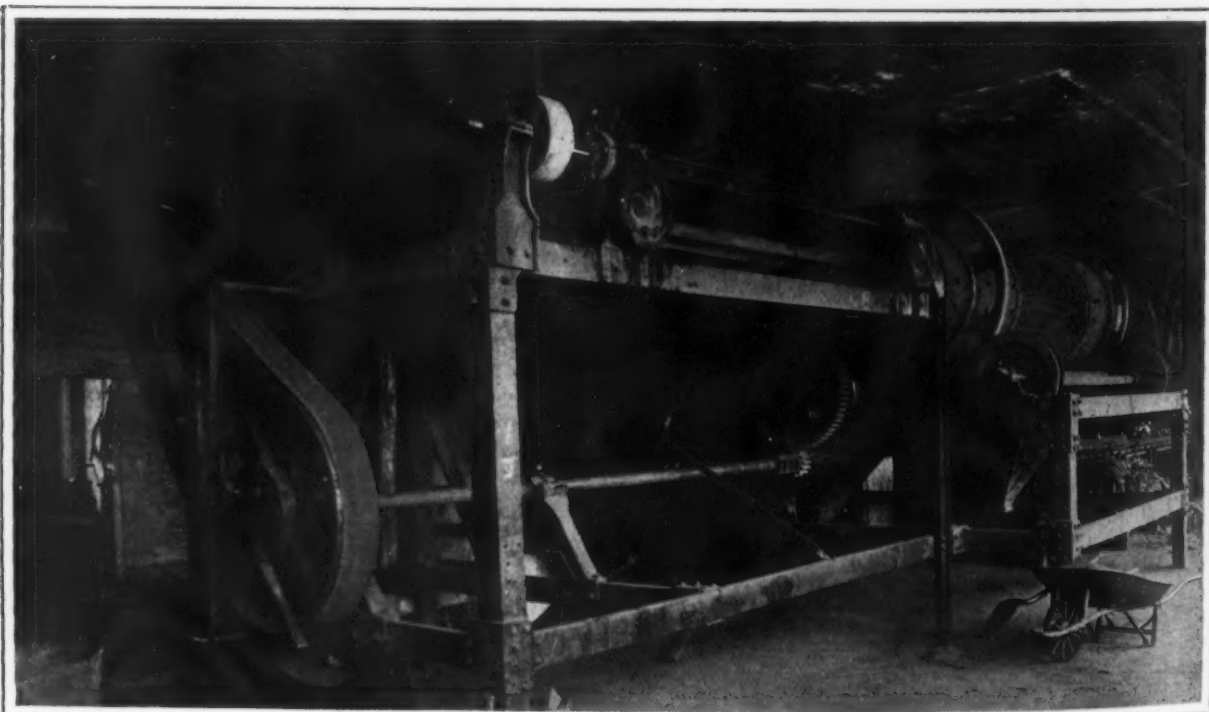
This type of man was hard to find, but eventually J. F. Stanley, efficiency manager for a large manufacturing corporation in Anderson, was engaged. Though Mr. Stanley had never had any foundry experience, his experience as an efficiency man taught him that there were many ways in which improvements could be made in almost any manufacturing operation. He resigned his other position and entered the Lavelle Foundry Co. as a partner.

Spending ten days in the plant of the company at Anderson, Mr. Stanley was able to get a clear and un-

prejudiced insight into its workings, and visions of the foundry of the future, practically automatic, began to pass through his mind. Transferring his ideas to paper, he soon had designed a foundry building which, with equipment, has enabled the company at its Indianapolis plant to more than treble the output of similar work at its Anderson plant, with the use of a much less number of men, and also to do it much more economically.

The design of the foundry equipment was started in May, 1920, and the foundry was placed in operation Nov. 10, 1923. This is a case where the foundry building was designed to house the equipment, and, incidentally it may be mentioned that practically all the equipment installed was built by the company at its Indianapolis and Anderson plants, under the personal supervision of Mr. Stanley, who also superintended the erection of the foundry building.

The building itself is of reinforced concrete, three



Molds Dumped Through Chute on Floor Above Reach Shaker Grates on Bottom Floor. Castings are delivered to two automatic tumbling barrels, while sand passes into hopper, whence it is elevated to sand screen at top of building, for further use

stories high, 60 x 200 ft., with glass inclosed sides. A three-story foundry building may be somewhat of a novelty, but the general idea back of its construction was to get away from the customary horizontal plane common to foundries. All three floors are in use for foundry operations, the work starting at the third floor and finishing at the bottom. Mechanical methods of handling all materials are in use throughout the foundry, and this gives a flexibility of operation that allows for a greatly increased output when occasion requires. All the mechanical apparatus has not yet been installed, but the foundry, as operating today, is pretty nearly the last word in automatic operation.

Raw materials are now unloaded by hand from cars onto a platform extending along the full length of the building. Later, mechanical means for unloading will be installed. A portable marine type of elevator, run-

separator located on the ground floor, where the core knobs are removed and the iron dribblings taken back to the cupola. The molding sand drops through the screen to a belt conveyor, which carries it to the tempering station, where it is moistened and then dropped into the revivifier, and thence into a continuous drag flight conveyor for delivery to the molding machine.

The continuous drag flight conveyor is of special design. The flights are spaced 2 ft. apart, and the conveyor has a capacity of 130 tons of molding sand per hour. The conveyor trough is made of steel plates, in sections, any one of which can be replaced, if worn, without disturbing the next section. The pedestals supporting the conveyor are hollow, and serve as the upper ends of chutes for delivering the sand to the molding machines on the floor below.

The conveyor is of the chain and sprocket type, and



Drag Flight Conveyor for Handling Molding Sand to Molding Machines on Floor Below. The sand drops through the hollow supporting pedestals to chutes. Operator at the bend, at left, controls the movement of the sand throughout the system. The conveyor trough is built of steel plates, in sections. Inset shows molding machines on floor below. Sand is delivered through chutes from drag flight conveyor on floor above. Specially designed gates control the flow of sand

ning on tracks along the full length of this platform, and extending over the parapet of the building, elevates coke, coal, molding and core sands by means of buckets to the roof, where these materials are dumped through manholes to service bins located on the third floor of the building.

An elevator conveys the pig iron to the charging floor, where, for the present, the charges are prepared. Later, charges will be prepared on the platform, and conveyed directly by elevator to the charging floor. From the coke storage bins the coke is conveyed by monorail to the charging floor. Ample space has been left on this floor for a reserve supply of raw materials for the cupola, a track and buggies being provided on which charges can be handled easily.

Sand Handling

Molding sand is put into operation from the service bins by means of chutes; a bucket elevator to a screen in pent-house on the roof of the building brings the used sand from the bottom floor back into the system. The purpose of the screen is to separate the core knobs and iron dribblings from the molding sand. These pass through the screen to a chute and over a magnetic

the driving mechanism consists of a cluster of driving gears and sprockets, mounted in oil-tight cases, and running in oil baths. These gears are driven by a line shaft, and connect with four large driving sprockets located at the four corners of the conveyor, the driving action being equalized on all four sprockets. The drag flights are mounted on heavy chain rolling over the sprockets, and are carried by small trunnions, running



on each side of the conveyor trough. These trunnions are fitted with dust proof covers. The speed of the conveyor is now fixed at 80 ft. per min.

Only one man is required to take care of all the molding sand used in the foundry. He takes up his position near the tempering station. A valve conveniently located controls the flow of water for moistening the sand, and if too much sand is being delivered to the conveyor, a pull on a lever automatically reverses the belt supplying the conveyor, and the sand is dumped into the service bin.

In delivering sand to the molding machines on the second floor, the sand chute is a continuation of the pedestal support of the third-floor sand conveyor. Each chute is at all times full of sand, and is located directly above its own molding machine. A specially designed gate in the chute regulates the flow of sand, allowing the molder to get as much or as little sand as he requires. After the mold is made the operator places it on an endless carriage conveyor, the speed of which can be controlled, but which usually runs at 40 to 60 ft. per min., depending on operating conditions.

Handling Molds

This mold conveyor is 360 ft. long, and is supplied with 172 mold carrying cars, which are of the 4-wheel ball-bearing type, and run on a conical track. The conveyor, of the chain and sprocket type, is driven by a cluster of gears extending to a large bevel gear and sprocket at each of its ends. Immediately above this conveyor, and driven by the same mechanism, is a similar one 200 ft. in length, which conveys the bottom boards from the dumping station back to the molding machines.

The molds are checked on the way to the pouring platform. In case of accident, or whenever desired, the whole mechanism can be stopped instantly by a conveniently located lever. The smoothness of operation of this conveyor is uncanny. A demonstration by Mr. Stanley consisted of standing a lead pencil on end and sending it completely around the full length of the conveyor without its falling flat. From this it will be seen that there is little chance of a mold breaking up before it reaches the dumping station.

After passing the checker the mold continues to the pouring station, where the molds are poured as they pass the cupolas. The pouring is done by a pouring crew with hand ladles, from a specially constructed movable platform, 40 ft. long, which runs at the same speed the mold is traveling. The slip cases and weights are put on immediately before the molds are poured, and are removed by the same workmen after the mold has been poured and has returned to their position on the opposite side of the conveyor. With the use of the pouring platform, ample time is available to pour all molds as they pass the station. At present the pouring gang handles 18 molds per min., but this can be materially increased when the full complement of molders is at work.

From the time of pouring to dumping the mold 6 min. elapse. The slip cases and weights are removed just before the molds reach the dumping station. Two men remove the molds from the conveyor and dump them into a hopper, at the same time placing the bottom boards on the upper conveyor, to be taken back to the molders. The castings drop through a chute to shaker grates, located on the first floor, where the sand is shaken off. The castings then move into two continuous tumbling barrels, where all gates and sprues are automatically removed. The sand passes from the shaker grates into a hopper, which feeds it directly into a large bucket elevator, which carries it back to the sand screen at the top of the building, described previously, and into operation again.

Castings are automatically carried from the two large tumbling barrels into two continuous sand blast

barrels and, after cleaning, to a moving conveyor, where they are segregated from sprues and gates. The castings are given a preliminary inspection before being conveyed to the grinders, and a final inspection before packing and shipping.

Core Making

The core room, located on the second floor, also is served mechanically. The core sand bins are located on the third floor, in close proximity to the sand mixer. Sand is carried from the bins to the mixer by a mono-rail system and, when properly mixed, is dropped through a chute to a drag flight conveyor, similar in construction to the one handling the molding sand, and suspended from the ceiling above the core makers' benches. The sand is delivered by chutes to the core makers, a gate allowing the flow of sand to be controlled. After the core is made the core maker, simply turning around, places it in a drawer of the drawer-type ovens for baking. The handling of core sand from start to finish is cared for by one man, with the exception, of course, of the core makers.

Mr. Stanley has devised a scheme for baking cores by using the spent gases from the cupola, but this is not in operation as yet. He has designed a special blower, with heavy cast iron sides and boiler plate impeller plates and shell. His idea is to draw the spent gases from the cupola through the blower, forcing them through conduits to the core ovens for baking. The temperature of the gases will be automatically controlled by thermostatic arrangement.

Two cupolas of special design are in use, alternating each day. The cupolas are of 72-in. shell, lined down to 36-in. Instead of being mounted on legs they are placed on concrete foundations on the second floor of the building. Underneath the cupolas are two chambers for droppings and slag. This fireproof construction removes all danger from fire and other causes surrounding common cupola practice. The bottom doors are raised and lowered mechanically by specially designed windlasses at each end of the cupolas.

Wind boxes, tuyeres and tuyere openings are also of special design, simplifying the admission of air into the tuyeres and making possible the opening up of tuyeres while the cupola is in operation. Slag spouts are in the rear of the cupolas, the slag being dropped through a manhole to a separate chamber below the floor, thereby separating the slag from the droppings. The two cupolas are supplied air by a large Spencer turbine blower, with a specially designed air gate to permit transferring air from one cupola to the other. The blast is controlled by this special air gate, giving the cupola a range in melting capacity of from 1 to 5 tons per hour. The cupolas are operated 8 hr. each day.

Metal is tapped into a large mixing ladle, mounted on a track for convenience in moving it from one cupola to the other. The metal is poured from the mixing ladle to the pouring ladles from a bottom spout instead of a top spout, such as is common usage. This is an advantage in securing clean iron.

Time and Labor Saving

The whole plant and equipment were designed to save as much time and labor as possible. Cross-overs are constructed over the various conveyors for the convenience of workmen, and circular stairways conveniently located facilitate moving from one floor to another. Air shafts are also constructed to carry off dust and smoke.

The foundry is now running on light gray iron castings, and the output runs as high as 18 tons per day. The castings made generally weigh from 5 to 20 lb. Eight molding machines are in operation, and the number of molds put up by molders in 8 hr. runs up to 400 on a day-work basis.

What the installation of the equipment means in the



Drawer Type of Baking Ovens in Use. Installation has not been completed, and scheme is now being installed for baking cores by waste gases from cupola. Core sand is delivered to benches by suspended drag flight conveyor

saving of time of the molder may be gathered from the fact that, on one job of cored work, the fastest workman in one of the company's plants was able to put up only 90 molds per day, whereas in this Indianapolis plant one molder has put up 281 molds. On plain work, the number of molds has been increased from the average of 100 to 125, in the old foundry, to 350 to 400 in the Indianapolis plant. The speed with which castings are turned out may be gathered from the time required from the molding floor to the shipping platform. This operation, including molding, pouring, shaking out, cleaning, grinding, inspection and packing requires an average of 18 min., and this can be reduced by a speeding up of the machinery, in case it becomes necessary.

The economy of operation can be seen from the fact that a 40-hp. motor drives all the machinery in the plant. All line shafts are equipped with ball bearings, and conveyors are also similarly fitted. It was at first

planned to install a power plant, but the necessity for getting the plant in operation at this time prevented carrying out this plan, although provision has been made for it in the design. The plant has now been in operation over three months, and has justified all expectations.



The Pouring Platform, 40 Ft. Long and Moving at the Same Speed as the Mold-Carrying Conveyor, Enables the Pouring Gang to Take Care of All Molds While Passing the Station. Eighteen molds a minute are now being poured. At the left cupola spout and mixing ladle are shown. In the circle is a close-up, showing car structure for carrying molds

Mining and Metallurgical Engineers

Open-Hearth and Blast Furnace Problems Discussed at Annual February Convention—Stainless Iron, Oxygenated Air and Other Subjects

THE quality of the papers presented at the sessions of the iron and steel division of the American Institute of Mining and Metallurgical Engineers this year was in strong contrast to the program offered a year ago. In fact, the program for these sessions, held during the 129th general meeting, Feb. 18 to 21, at the Engineering Societies Building, New York, was considered by many fully equal to the best traditions associated with the splendid papers and discussions of this section during the war and earlier.

A well conceived range of subjects, touching upon several of the leading problems of the iron and steel industry, was covered in papers by competent authorities. Blast furnace and open-hearth problems, new developments in metallography, stainless steel and iron, the structure of metals, refractories and other subjects were the leading topics. The attendance was large and the discussions, when possible, were animated and instructive. The principal drawback to complete success was the limit to adequate discussion due to a too ambitious program and hence lack of time.

The two leading events of a general nature were the annual lectures by two distinguished metallurgists. The third Institute of Metals Division lecture by Dr. Zay Jeffries and the first Dr. Henry M. Howe Memorial lecture by Dr. Albert Sauveur were landmarks in scientific metallurgical progress. Abstracts of both are presented in THE IRON AGE, Feb. 21 and March 6. The fourth Institute of Metals lecturer, for next year, is announced as Dr. Carl Benedicks, director of metallographic research, Stockholm, Sweden, a man internationally known. The sessions of the Institute of Metals division were as successful as previous ones. A report of these will appear next week.

A feature was the decidedly profitable general meeting on oxygenated air as applied to industry, particularly metallurgical operations. A report of this and of the iron and steel sessions follows.

Papers and Discussions of the Iron and Steel Division

FROM a practical viewpoint, the most interesting session was that of Tuesday afternoon, Feb. 19, when papers covering open-hearth practice, stainless steel and iron, refractories for steel furnaces and one phase of blast furnace practice were scheduled. The scope of the program was so large that the portion devoted to the blast furnace and to refractories was postponed to the following morning.

Stainless Iron

The stainless steel and rustless iron development was brought before the session by a paper entitled, "Stainless Steel with Particular Reference to the Milder Varieties," by J. H. G. Monypenny, chief of the research laboratory, Brown Bayleys Steel Works, Ltd., Sheffield, England. This was presented in abstract by Dr. George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass. An abstract of the portion relating to stainless iron appears elsewhere in this issue.

The discussion of this paper was opened by P. A. E. Armstrong, vice-president Ludlum Steel Co., Watervliet, N. Y. The speaker commented on various aspects of Mr. Monypenny's references to stainless iron, agreeing with the author on the property of this iron to harden even with a low carbon content. He stated that he had experimented with combinations of chromium and iron having carbon as low as 0.03 per cent which he claimed were capable of hardening, but he stated that carbon was not the cause of the hardening. The facts are "that chromium and iron without any other alloying element will harden when subjected to heat treatment by being raised to a high temperature and quenched."

Mr. Armstrong dwelt also on a product which his company has been making for some time which contains chromium around 16 to 18 per cent and silicon around 0.50 to 1 per cent, with a very low carbon content. It is claimed that the presence of the silicon bestows certain properties upon the alloy which do not exist in the absence of the silicon. He dwelt upon the tremendous field for the use of rust resisting irons and stated that developments were proceeding very rapidly so that this material can be put upon the market at a price low enough to be attractive; in fact, he said that arrange-

ments had just been made by one large company which has scheduled a program of 100,000 tons of stainless iron as a year's output.

Dr. B. D. Saklatwalla, Vanadium Corporation of America, Bridgeville, Pa., in commenting on Mr. Monypenny's paper stated that, in the original stainless steel, a range of 11 to 14 per cent chromium had been selected because this was particularly adapted to cutlery since under 11 per cent chromium is not stainless and over 14 per cent chromium does not harden. High-chromium low-carbon combinations are capable of hardening but the presence of silicon is not to be considered. The effect of silicon, he continued, is a good one but in stainless iron the presence of another element, copper, has been found to make the higher chromium combinations more resistant to corrosion and to the effect of acids. For engineering purposes not all the work on stainless iron has been done in Great Britain but the work in this country is far ahead of anything done anywhere else, said the speaker. The great factor which has hindered the development of stainless iron has been its cost. When it is considered that from 300 to 400 lb. of expensive low-carbon ferrochromium must be added to a ton of steel it is evident, said Dr. Saklatwalla, that no engineering business on a large scale can be obtained. A more economical process is necessary and in his opinion the production of the iron by the direct reduction of chromium ore, which has been developed in both Great Britain and here, offers more possibilities for the future.

Open-Hearth Practice

Two interesting papers on open-hearth practice embraced one entitled "Economic Significance of Metalloids in Basic Pig Iron in Basic Open-Hearth Practice," by C. L. Kinney, Jr., superintendent of open-hearth No. 1, Illinois Steel Co., South Chicago, and the other "Absorption of Sulphur from Producer Gas," by J. H. Nead, chief metallurgist American Rolling Mill Co., Middletown, Ohio. Both of these papers were presented in abstract by the authors. A portion of the paper by Mr. Kinney will be published next week.

The chairman of this session, J. V. W. Reynnders, called attention to a previous paper by Mr. Kinney and an associate which a year ago received the Hadfield

prize award and commented on the value of both as contributions to open-hearth steel literature.

V. J. Pazzetti, Bethlehem Steel Co., Bethlehem, Pa., after complimenting the author on his valuable contribution to the subject, spoke among other things of the more beneficial value of the presence of 1.50 per cent manganese in the pig iron than 1 per cent. When it comes to the use of the pig iron containing 2 per cent manganese it was his opinion that the removal of the slag takes too much time. The general benefit, however, of the presence of manganese in pig iron and the residual manganese in the bath he regarded as the best recognized practice at present, although there were certain considerations as to the cost of scrap, the tapping time and other factors which entered into the matter depending upon local and other conditions.

Dr. George B. Waterhouse, after referring to some of the important papers presented previously before the institute on this subject, emphasized silicon and sulphur as the most harmful metalloids in pig iron. Silicon in his opinion is a leading cause of the increase of slag volume, the time for the removal of carbon and the consequent coal consumed, but sulphur is the one that is feared the most.

The paper by Mr. Nead on the absorption of sulphur from producer gas deals with a subject to which there are many references in literature but on which few actual data have been published, according to the author. Two open-hearth heats in which ingot iron was made are discussed in the paper, data being presented on the absorption of sulphur from the producer gas as represented by analyses of the steel and the slag frequently during the progress of the heat. The author states that such absorption as occurs takes place during the melting-down stage when large quantities, possibly up to 0.025 per cent or more of sulphur, are absorbed. This, of course, is in addition to the sulphur already contained in the metal charged.

C. L. Kinney, Jr., in discussing this paper said that the evaluation of coal on the sulphur content alone was not advisable. He prefers a coal containing 1.25 per cent sulphur with a B.t.u. value of 14,000 in preference to a coal containing 0.75 per cent sulphur but with a heat value of only 11,000 B.t.u. His reason for this preference was the higher flame temperature obtainable.

Effect of Ingot Molds on Steel

The subject of ingot molds and their effect upon steel was brought up by a paper entitled "Effect on Steel of Variations in Rate of Cooling in Ingot Molds," by William J. Priestley, metallurgical engineer Electro-metallurgical Sales Corporation, Pittsburgh, Pa., who presented it in abstract. The author shows in a discussion of somewhat elaborate nature that ingotism and segregation, the formation of dendrites and the distribution of intergranular material bear definite relations to the rate of cooling and the solidification of steel in the mold. He also shows that steel most rapidly solidified in the mold responds most easily to heat treatment. "Forging improves the physical properties of steel cooled slowly in the mold but it cannot correct the bad effects resulting from the segregation of intergranular material." It is his contention "that while steel should be cast in the mold as cold as possible, in order to obtain uniform structure and chemical analysis, higher temperatures in the furnace before tapping will help rid the steel of occluded gases and foreign non-metallic inclusions and give a better and more uniform solution of alloys and other desirable constituents. The best results are obtained by getting the steel hot in the furnace and making all the additions possible before the steel enters the ladle. In some cases the steel is cooled in the furnace, but more often it is tapped into the ladle where it is held until the proper casting temperature is obtained." The results presented by this paper were based upon a comparison of ingots cast in both iron and sand molds with a chill respectively of about 5 to 1, about 3 to 1 and 1 to 1.

This paper was discussed by Emil Gathman, Gathman Engineering Corporation, Baltimore, in a somewhat lengthy written contribution, who stated that for many years he had considered the rate of cooling of an

ingot as a fundamental factor in determining the chemical as well as the physical characteristics of the solidified steel casting and he said that all his ingot mold designs have been based upon this theory. He proceeded to describe the steps which have led to his advocacy of the big-end-up mold.

More than five years ago he said that his company had advised steel makers that an increased ratio of mold chill beyond 2 to 1 was of real value only when employed in conjunction with an ingot of inverted, pyramidal form and suitable taper, or the so-called big-end-up type. In the big-end-down and uniform chamber molds an air gap forms within a very short period between the outer peripheral solidified skin of the ingot and the mold walls which retards the transmission of heat from the ingot to the mold wall irrespective of the ratio of chill. His company has found that a very heavy metallic mold wall, when used in conjunction with the big-end-down ingot, actually increases the time of solidification of the interior of the ingot. He agreed with the author's deduction that the horizontal as well as the vertical contour of the ingots should be such that lines of weakness are eliminated or reduced as much as practicable.

George A. Dornin, also with the Gathman Engineering Corporation, read a brief discussion of Mr. Priestley's paper, concluding with the statement that he had "recently split a forging steel ingot cast in a big-end-down mold of standard dimensions on which a refractory hot top had been used. This ingot weighed approximately 3 tons, was made from a deoxidized heat of steel, was poured at the lowest possible temperature and hence may be regarded as good practice in a big-end-down ingot. It was approximately 20 in. square. Along the axis of this ingot and extending within 10 in. of its bottom end was a flawed zone approximately 5 in. square. This zone in one plane contained more than 25 actual flaws varying in length from $\frac{1}{4}$ to $\frac{3}{4}$ in. Had this ingot been rolled into bars for charging not one per cent of it would have been sound and it is representative of the best that can be gotten with a big-end-down ingot. Heavy mold wall chill is of value to industry in the production of sound steel only when it is employed in conjunction with the big-end-up mold and when it is used as an aid in outwardly distorting the lines of freezing ingots from bottom to top and hence is only of value when used progressively."

Blast Furnace Coke Combustibility

The two papers crowded out of the Tuesday afternoon session were presented Wednesday morning and covered the subject of coke combustibility in the blast furnaces and refractories for open-hearth furnaces.

The blast furnace paper was entitled "Effect of Coke Combustibility on Stock Descent in the Blast Furnace," by P. H. Royster and T. L. Joseph, Minneapolis, Minn., both metallurgists of the Bureau of Mines. The paper was read in abstract by Mr. Joseph. Briefly the authors contend that stock descent in blast furnaces is affected by the size of the combustion zone which varies inversely with coke combustibility. The predominating tendency is for the coke to feed downward into the space where combustion is taking place.

The authors discuss three types of combustion as illustrated by means of a small model, reproductions of which were thrown on the screen. With a fast-burning coke, they find that combustion is restricted to within a short distance from the tuyeres, and the charge moves more rapidly near the edge of the furnace. In the case of more slowly combustible coke this is consumed nearer the center and results in a greater movement of the stock in this portion of the furnace.

The chairman of this session, R. H. Sweetser, American Rolling Mill Co., Columbus, Ohio, discussed the authors' paper somewhat in detail. He dwelt upon the value of this contribution to the subject, particularly its reference to the penetration of the blast. In his opinion many wrong ideas are prevalent as to what is meant by the combustibility of coke and he thought that distance of travel is often confused with the speed involved in combustion. Mr. Sweetser offered a new definition of the combustibility of coke as "the rate of complete gasification in front of the tuyeres under standard

conditions of blast temperature and volume." The combustibility of coke could be improved by coke oven operators and Mr. Sweetser contended that it has been done in his own experience.

Arthur G. McKee, McKee & Co., Cleveland, Ohio, called attention to the confusion existing in the minds of many on this subject and offered a suggestion, which later was put in the form of a motion and carried, that coke oven men, blast furnace men and special investigators in this field get together and determine what is really meant by the combustibility of coke.

Refractories for the Open-Hearth

An interesting contribution to the important question of open-hearth refractories was a paper entitled "Observations on Requirements of Refractories for Open-Hearth," by F. W. Davis, metallurgist Bureau of Mines, and G. A. Bole, superintendent ceramic station, Bureau of Mines, Columbus, Ohio. The paper is based upon results obtained in a survey by the Bureau of Mines of the metallurgical requirements for open-hearth practice resulting from various investigations and interviews with men in the industry, particularly open-hearth superintendents in some of the larger steel plants from the Chicago district eastward. The paper deals in a general way with certain of the necessary requirements for various units or parts of the open-hearth structure. The author discusses refractories in common use for the different parts, both as to the service they are giving and their suitability under existing chemical, thermal and physical requirements. The relation between the service and the allowable cost of a refractory is discussed and suggestions are asked for.

A valuable discussion of this paper was presented by C. L. Kinney, Jr., who, after emphasizing the vital interest of the matter, stated that any changes in existing equipment would have to be based, of course, on the economic results or savings which might be effected by the use of a refractory which would eliminate the loss of time consumed by present repairs. If the higher price for refractories for a back wall, for example, would compensate for the time lost in output in repairing such falls, the extra cost would be justified. For example, during the life of a silica roof, the back wall often has to be repaired four times, which means considerable loss of output. The real question involved was a decision as to whether the extra cost of a refractory which would eliminate the necessity for such repairs would equal the loss in the output of finished steel which might otherwise have been produced. Mr. Kinney also discussed various other parts of a furnace such as the port ends, emphasizing the fact that the port ends and combustion chamber need the most attention as to new refractories. He stated that there is a need for better refractories in several cases and that the industry can pay a better price in many instances.

Mr. Reinhart, American Rolling Mill Co., stated that in the case of back wall repairs the loss amounted often to \$60 per hr. and he thought that the industry can pay almost three times the present cost to obtain twice the life of a new refractory. So far as the author's suggestion of the possibility of an open-hearth furnace which should fail all over at the same time, he did not think this could ever be realized. He believed that a more scientific operation of the open-hearth furnace is surely coming, eliminating the present excess of the human element.

Zirconium in Steel Making

New developments in metallography, certain effects of zirconium in the manufacture of steel and the subject of the constitution of metals were the topics discussed at the first of the steel sessions on Monday afternoon, Feb. 18. Dr. John A. Mathews, Crucible Steel Co. of America, New York, presided over this session.

Further information on the rôle of zirconium in steel making was presented in an interesting paper entitled, "Effect of Zirconium on Hot Rolling Properties of High Sulphur Steels and the Occurrence of Zirconium Sulphide," by Alexander L. Feild, research metallurgist, Electro Metallurgical Co., New York. Results presented in this paper are supplementary to information contained in a paper by the same author presented at

the August meeting of the Institute in Montreal and abstracted in *THE IRON AGE*, Sept. 6, 1923. His first presentation of the value of zirconium in steel making was contained in a paper presented before the 1923 spring meeting of the American Electrochemical Society in New York by F. M. Becket of the same company and published in *THE IRON AGE*, May 10, 1923.

The paper this year describes more in detail some of the hot rolling properties of a series of high sulphur steels compared with similar heats which had been treated with zirconium. It is shown by the author that from a consideration of the sulphur, manganese and zirconium contents of these steels, zirconium reacts with the sulphur of the molten steel in accordance with the equation $Zr + 2S = ZrS_2$. The author finds that zirconium disulphide appears in the finished state as gray colored inclusions, similar to manganese sulphide in their plastic behavior and general appearance. He states that zirconium completes its act of deoxidizing before proceeding to combine with sulphur and indirectly increases the effective sulphur-combining power of any manganese which may be present. The paper is illustrated with photographs of the treated and non-treated ingots after rolling and with photomicrographs illustrating the manganese and zirconium sulphide inclusions. The sulphur content of the steels examined ranged from 0.075 to 0.320 per cent. Summarizing the results, the author states that:

1. Zirconium eliminates red shortness when present in the finished steel in the proportion of 1.41 parts or more of zirconium to 1 part of sulphur; the ratio 1.41 corresponds to the formation of the normal zirconium sulphide, ZrS_2 .

2. Zirconium sulphide, like manganese sulphide, is plastic at rolling temperatures and, in polished sections, is visible as ovoid or elongated gray inclusions.

3. Evidence is offered in support of the view that oxygen is jointly responsible with sulphur for red shortness in steels that contain manganese only as a sulphur-combining element.

4. Zirconium, unlike manganese, is not required in the finished steel in amount greater than that theoretically required for formation of zirconium sulphide, because of its powerful deoxidizing action.

5. In amount greater than that required to form the sulphide, zirconium confers on the sulphur content of the steel the property of insolubility in 1:1 hydrochloric acid, the percentage of sulphur thus rendered insoluble being proportional to the excess of zirconium in the ratio of 1 part of sulphur to 10 of zirconium. An explanation of this phenomenon is offered.

Unfortunately sufficient time was not allotted at this session to afford adequate discussion of this and other papers, there having been six papers scheduled for presentation and discussion in only two hours. Dr. B. D. Saklatwalla, Vanadium Corporation of America, Bridgeville, Pa., commenting on the zirconium paper, stated that the author, in discussing the chemical combination of sulphur and zirconium, had overlooked other data and conclusions. It was his belief, he stated, that zirconium is one of the most powerful deoxidizers but he felt that this was secondary to its role as a coagulating medium which explained in part its efficiency in removing sonims and other non-metallic impurities.

New Developments in Metallography

The three papers on new developments in metallography dealt with new etching solutions and with conical illumination. Dr. Albert Sauveur, in conjunction with V. N. Krivobok, Harvard University, Cambridge, Mass., offered a paper entitled, "Use of Sodium Picrate in Revealing Dendritic Segregation in Iron Alloys." Dr. Sauveur presented this in abstract, stating that the investigation had to do with the possibility of using advantageously a boiling solution of sodium picrate to reveal dendritic segregation in steel. The paper describes the mechanism of the action of the reagent and is fully illustrated with exceedingly good photomicrographs. The authors note the failure of manganese alone to produce persistent dendritic segregation.

The second paper, dealing with etching problems, was entitled "Micrographic Detection of Carbides in Ferrous Alloys," by Norman B. Pilling, metallurgist,

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., who abstracted the paper himself. Certain problems connected with high silicon steels are dealt with and the object of the investigation was to obtain a method of micrographic analysis for such steels. The author has found that a dilute solution of nitric acid and methyl alcohol in nitro-benzol is advantageous. He describes the action of this reagent and states that it differs from sodium picrate in that there is no persistent deep-seated staining and also because the solution can be used cold. Photomicrographs illustrating the effect of this method of etching as compared with plain alcoholic nitric acid are given in the paper.

New Results of Conical Illumination

Further information on new developments in the application of conical illumination was given in a paper entitled "Stimulating Natural Light in Metallography," by H. S. George, metallurgist Union Carbide & Carbon Research Laboratories, Long Island City, N. Y. The author briefly abstracted the paper by means of lantern slides.

The information contained in this paper is supplementary to that which the author presented in a paper entitled "Conical Illumination in Metallography" before the annual meeting last October of the American Society for Steel Treating in Pittsburgh and which was abstracted in THE IRON AGE, Feb. 7. The author shows how, by simulating natural lighting, structures that possess relief are given a natural appearance and an example is included of the revelation of a hitherto invisible microconstituent. For example, etching figures in ferrite, heretofore considered to be pits, are revealed as pyramids, standing in bas-relief. The author offers suggestions on technique because, while the method is obvious, practice and attention to detail are requisite for success.

Commenting on the last three papers, Prof. Bradley Stoughton, department of metallurgy, Lehigh Univer-

sity, Bethlehem, Pa., pointed out that all three of these papers referred to methods of testing which are non-destructive. He believed that they were examples of a decidedly strong present tendency toward the development of other methods of non-destructive testing of metals, citing X-ray and magnetic analysis, and stating that developments in the two latter processes had been very rapid of late, involving results obtained not by hit-or-miss methods.

The Structure of Metals

The two papers dealing with the structure of metals were entitled "Overstrain in Metals," by Joseph Kaye Wood, engineer Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa., and the other, "The Nature of Martensite," by Dr. Edgar C. Bain, research metallurgist Atlas Steel Corporation, Dunkirk, N. Y.

Mr. Wood presented a brief abstract of his paper, stating that overstrain depends on the partial elastic action occurring above the elastic limit. Although this type of straining, within certain limits, improves most of the ordinary physical properties of a metal, it is detrimental in that it produces imperfect elasticity and elastic after-effects. The amount of overstrain depends on the amount of "hyper" elastic energy expended, which energy corresponds to the partial elastic action referred to above. Furthermore, this energy depends on both the elastic and plastic constants of the metal, the latter of which varies with temperature, pressure and time. With the aid of these principles, the shape of the stress-strain diagram is explained.

Dr. Bain presented a brief abstract of his paper. He describes in the paper the relation of martensite to austenite, the parent substitute, and goes into a detailed discussion of the lattice structure of the austenite as related to the martensite, and offers the explanation that martensite may result from the upsetting of a body-centered tetragonal lattice structure in austenite.

Oxygenated Air in Metallurgical Operations

THE first session ever devoted to a general discussion of the use of oxygenated air, particularly in iron and steel metallurgy, was held Wednesday afternoon, Feb. 20. The interest in the subject was attested to by a large attendance. Prof. Bradley Stoughton as chairman conducted the meeting so that the utmost possible was realized from those present.

The subject was introduced by the presentation in abstract, by the chairman, of a report by F. W. Davis, metallurgist U. S. Bureau of Mines, Washington, entitled, "The Use of Oxygen or Oxygenated Air in Metallurgical and Allied Processes." Abstracts of this report were presented in THE IRON AGE, one Nov. 2, 1923, on "Oxygen in the Iron Blast Furnace" and one Nov. 9, 1923, on "Oxygen in Steel Making and Ferromanganese Furnaces."

Before throwing open the subject to a general discussion other papers were presented, one entitled "Enriched Air in Metallurgy," by W. S. Landis, vice-president American Cyanamid Co., New York. Mr. Landis in this paper, after discussing the available supply of oxygen, its cost, its production from the atmosphere and from water, then dealt briefly with the only two serious attempts that he knew of to use enriched air in metallurgical work. The first one discussed was that made by the Belgians at Liège in their small iron blast furnace, and the other second comprehensive experiment was the use of oxygen by a well-known American metallurgist to produce ferrosilicon of high silicon content in a shaft furnace in Canada. Both of these attempts are discussed somewhat fully followed by a review of the fields for development in the use of oxygen in the copper and lead smelting industries, in the chemical and electrochemical industries and in gas generation. Mr. Landis brings his paper to a close with the following conclusions:

There are so many fields of possible utilization of oxygen or enriched air mixtures in metallurgy, each one presenting its own peculiar problem, that metallurgists will have to subdivide the field and attack

it more or less from separate and distinctive standpoints. There should be kept foremost in mind that an oxygas blowpipe is hardly a metallurgical furnace from the standpoint of ore reduction. The remarkable development of this apparatus, therefore, will throw little or no light on the kind of metallurgical problems discussed in this paper. I can only recommend that the experimentation with enriched air should start with carefully standardized metallurgical apparatus and that the oxygen content of the incoming air should be increased step by step. The many new problems of air introduction, of refractories and of new heat balance which will arise show that this is the only logical approach to the problem.

Taking as his topic "Cheap Oxygen in Metallurgy," Edmund B. Kirby, St. Louis, presented in abstract a valuable discussion which was not preprinted nor available for general reading. Calling attention to the amount of heat wasted because of the presence of nitrogen, Mr. Kirby emphasized some of the changes that would be necessary if it should be possible to use oxygen in metallurgical operations more generally than at present. Such somewhat revolutionary procedure, he believed, would involve a change in location of some industries and probably the elimination of much expensive apparatus. He presented a general view of what would be involved in the ultimate use of more oxygen, calling attention to the fact that not only was fuel saving an important item, to which too much attention had thus far been paid, but that also speed of operation was involved.

In blast furnaces it was the opinion of Mr. Kirby that the saving of fuel was a minor matter compared with the increase in speed possibly obtainable from the use of oxygen. He regarded the easiest application of oxygen to be in gas producers, followed possibly by its use in copper reverberatory smelting furnaces and then in copper blast furnaces. The use of enriched air in lead blast furnaces, in open-hearth furnaces and in the iron blast furnaces he believed could be brought to an advantageous consummation. In the case of the open-

hearth, a new layout would be necessary and the application of oxygen to the iron blast furnace he regarded as difficult. In the latter case, the use of cheap oxygen would result ultimately in the scrapping of much of the present equipment and a demand for a large amount of new capital.

Discussing the iron blast furnace, Mr. Kirby said that its efficiency was very poor from a thermal point of view because of the potential heat that was carried off. The application of enriched air to such a furnace he believed was a matter of long study. In his opinion, it would be ultimately found that the use of oxygen in the smelting of iron ore would result in the use of a furnace more like the copper furnace. This might be regarded as a strange conclusion but in general he thought that the application of oxygen to iron and steel metallurgy would have to be based upon a progressive study in the application of oxygen to the smelting of copper. In any event he believed that a certain amount of air enrichment would be profitable.

After the presentation of the foregoing papers, the meeting was thrown open by the chairman to a general discussion conducted under various subheads, the use of oxygenated air in the iron blast furnace being taken up first.

R. H. Sweetser, American Rolling Mill Co., Columbus, Ohio, in discussing enriched air in the iron blast furnace said that his experience had been limited to the use of one tank of oxygen in 1914 in opening up the tuyeres of a chilled furnace. He agreed, however, with many of the statements of Mr. Kirby, particularly the matter of the speeding up of a furnace by the use of oxygen, calling attention to the fact that in zero weather a furnace worked faster. He realized, however, that the application of oxygen would involve many changes in the structure of the furnace.

Rectangular Furnaces

The statement of Mr. Kirby that the ultimate form of the iron blast furnace would be similar to the rectangular copper blast furnace was to him startling. From his own experience, however, he had found that many iron blast furnace problems had come from the copper blast furnace and had been solved partially through that medium, referring in particular to the 1912 convention when a discussion on copper slags was a feature. In his opinion there was no question as to an increase in speed resulting from the use of oxygen and he cited the problem as to whether a hotter hearth in the blast furnace would not result in lower sulphur and higher carbon.

Waldemar Dyrssen stated that the rectangular hearth for an iron blast furnace was not new and that in Russia before the war he saw several such furnaces operating satisfactorily at that time which were about 12 to 15 ft. long and 3 ft. wide.

A. L. Field, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., briefly emphasized what he claimed was an error in the original report of F. W. Davis, where the latter draws the conclusion that the 18 per cent increase in production was due to the presence of 31 per cent oxygen. In his opinion he believed that it was demonstrable that the increased output was due to a dryer blast.

Arthur G. McKee, of McKee & Co., Cleveland, Ohio, read portions of a discussion emphasizing the great interest in the work of the Bureau of Mines on this and other subjects, and pointing out the great strides in the equipment of blast furnaces since the time of Sir Lowthian Bell. Various phases of the oxygen problem were touched upon by Mr. McKee. An important suggestion which he offered was the possibility of the introduction of powdered charcoal or powdered coal at the tuyere level, keeping the heat where most needed and bringing about the reduction of ore with a minimum of fuel in the upper reaches of the stack and with a resultant gas high in carbon dioxide—in short, a combination with a high heat efficiency.

T. L. Joseph, associate metallurgist United States Bureau of Mines, made a plea for an opportunity to study the application of enriched air to a blast furnace by using the small experimental furnace at Minneapolis

and he expressed the belief that such a trial would show marked savings and interesting results.

The Annual Banquet

A feature of the annual banquet at the Waldorf-Astoria, Wednesday evening, Feb. 20, was the presentation of the James Douglas medal for 1924 to Charles W. Merrill of San Francisco, in recognition of improvements in the practice of cyanidation. The presentation was made by Charles F. Rand, New York, chairman of the medal committee for 1924. The first award of the medal was made last year to Frederick Laist for research and achievement in the metallurgy of copper and the electrolytic production of zinc. Another feature was the presence of Dr. R. V. Wheeler, Sheffield, England, representing the Institution of Mining Engineers of London, who delivered an appropriate acceptance of the words of welcome of the toastmaster, J. V. W. Reynnders. Dr. Wheeler has just arrived in this country and is here for a few weeks on a semi-diplomatic mission and, with an associate, will confer with officials of our Government, looking toward the furtherance of safety in mining among other matters of investigation. The other addresses of the retiring president, E. P. Mathewson, and the new president, William Kelly, concluded the post-prandial program. Mr. Mathewson referred to the excellent record of the past year, the net loss in membership having been only 285. Prince Gelasio Gaetani, Italian ambassador to the United States, was announced as elected to honorary membership in the institute.

New Officers for 1924

With one or two exceptions the officers and directors for the year ending February, 1924, were reelected for the ensuing year. The new president is William Kelly of Vulcan, Mich. J. V. M. Reynnders, New York, was reelected first vice-president as was also Charles F. Rand, the treasurer.

The new president, William Kelly, is widely known in engineering and industry. He was born in New York City, April 17, 1854, being graduated from Yale in 1874 and from Columbia University School of Mines in 1877. Mr. Kelly became assistant superintendent of the Chemical Copper Co., Phoenixville, Pa., early in his professional career and later was a chemist for the Himrod Furnace Co., Youngstown, Ohio. Later he was superintendent of the Kemble Coal and Iron Co., Riddlesburg, Pa., and of the Glamorgan Iron Co., Lewistown, Pa. He assumed the general management of the Penn Iron Co. at Vulcan in 1889. While occupying this position he was general manager of the Republic Iron Co. of



WILLIAM KELLY

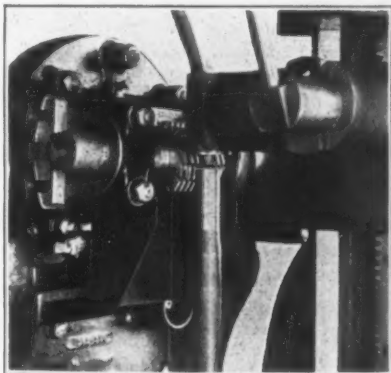
Michigan for 12 years. From 1885 to 1889 he was president of the board of examiners of Bituminous Mine Inspectors of Pennsylvania and since 1897 he has been a member of the board of control of the Michigan College of Mines. He has been a frequent contributor to technical journals. He has been conspicuous for many years in his relation to the iron ore mining industry of the United States. He is a member of the Institution of Mining and Metallurgy of London, the Mining and Metallurgical Society of America and the Lake Superior Mining Institute, of which he is a past president. In his presidential address to the American Institute of Mining and Metallurgical Engineers he stressed the necessity of expanding the field of industrial relations. At the banquet he impressively further expanded some phases of this subject. Recently Mr. Kelly attracted wide attention through a suggestion that engineering degrees be postponed for several years after the student has completed his professional course.

EIGHT-SPINDLE SPLINE HOBBER

Production of 1080 Pieces Per Nine-Hour Day
Claimed—Reduced Floor Space a Feature

The finishing of eight pieces of work by as many hobs during the time that the upper member of the machine revolves past one operator is accomplished by the multiple-spindle hobbing machine illustrated, which is a recent development of the Sommer & Adams Co., Cleveland. Although specially designed for hobbing splines on one end of automobile axle shafts, the machine is adaptable to other work and it is believed that the same principles could be applied to the hobbing of gears.

Eight-Spindle Spline Hobbing Machine. Eight pieces of work are finished during one revolution of the machine, production at the rate of 1080 pieces in nine hours, or 30 sec. per piece, being claimed. The machine is made up of eight distinct units spaced equally around the machine, each unit consisting of a work head, a cutter head and their respective driving mechanisms. The cutter and work head of each unit is attached to the outside of a turret which rotates around the base on an upright column at the center. The arrangement of the hob and work is shown in the close-up view below



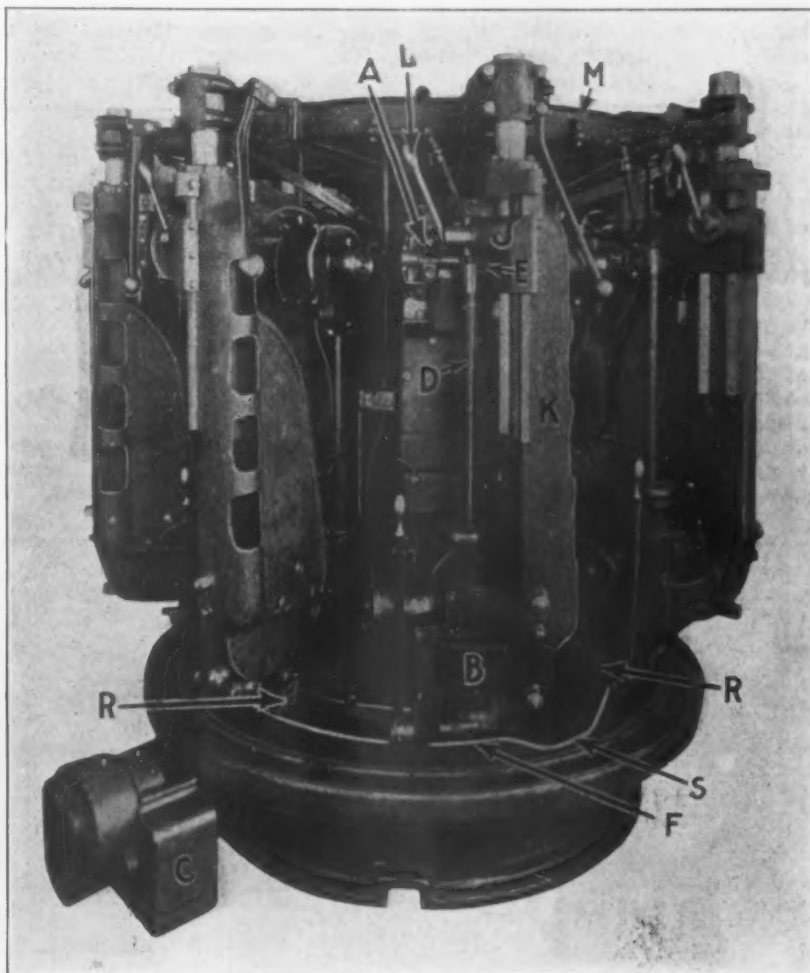
The production of 1080 pieces in nine hours is claimed, which is on the basis of one revolution of the machine every 4 min., but it is said that the machine may be operated at a higher rate of speed. Large production, greatly reduced floor space, and much less handling of the product are features emphasized by the makers.

The machine is made up of eight similar units, spaced around the machine. Each unit consists of a work head, cutter head and their respective driving mechanisms. The cutter head, shown at A in the accompanying full-view illustration and the work head B, of each unit is attached to an upright turret, which rotates constantly around the base on which it is held centrally by means of an upright column at the center. The machine is driven by a 7½-hp. 1200-r.p.m. constant-speed motor which is connected direct through spur gears. The box C contains a pair of slip change gears from which the drive is transmitted by a shaft to the inside of the turret where the horizontal shaft is equipped with a worm that drives a short vertical shaft through a worm wheel. A spur pinion at the upper end of the vertical shaft drives a ring gear extending completely around the turret, effecting its rotation.

Slip gears in box C may be changed to give various turret speeds. Special oiling devices are provided for lubricating the surface of the base on which the turret rotates.

Work Fed by Cam Around the Base

From the close-up illustration the relative position of the work D and the hob E may be noted. The work is fed the required distance past the hob by means of the cam F, shown in the full view, that extends completely around the base of the machine, and the rollers, R, attached to the lower portion of each work head. The travel of the rollers on the cam raises and lowers the entire work-holding assembly, as the latter is carried around the base. The cam has an abrupt drop at S from highest to lowest position, extends at



the low level S for a short distance and then rises quickly, after which it continues gradually at a slow rate until the highest point is reached. When the cam roller is at its lowest position the work is entirely withdrawn from the hob, permitting work to be conveniently removed. As the roller leaves the low position the work is brought into contact with the hob and then fed gradually until the highest position is reached, when the operation is completed.

The drive to the hob and work spindles is through a horizontal main driving shaft to bevel gears and a vertical shaft which extends to the top of the central column of the turret where there is a large bevel gear. Meshing with this gear are eight bevel pinions mounted loosely on shafts radiating to each hob head, and it is through these horizontal shafts that the hob and work spindles are rotated, when the clutch provided is operated by handle G to connect the pinion and shaft of any particular unit. The drive of each unit may be separately engaged or disengaged.

From this horizontal drive the drive to the hob spindle is through change gears and bevel gears to a shaft located in the same horizontal plane as the hob spindle, and from which the hob spindle is driven

through bevel gearing. The bracket in which the hob spindle is held may be adjusted radially to permit setting the hob at various angles, and there is also a longitudinal adjustment. A screw with a micrometer dial is provided to permit of making accurate settings.

Arrangement of Work Head Unit Drive

The work spindle units are also driven from the horizontal shafts that radiate to each unit from the central bevel gear, the drive being transmitted through bevel gears and a long vertical shaft in housing *B*. From this vertical shaft the drive is through bevel gears, change gears and worm gearing to the vertical work spindle. The proper ratio of rotation of hob and work spindles is accomplished by means of the change gears provided for both the hob and work heads. With a 10-spline axle shaft the hob spindle revolves ten times to one revolution of the work spindle. A handle attached to a cam directly under the center of the work spindle operates a knockout for removing

work from the spindle as soon as it has been finished.

The lower end of the work is tapered and seats in a socket in the work spindle, the upper end of the work being supported by a center mounted in the vertically adjustable stock *J*, as shown. The stock is mounted on the arm *K* which is bolted to the work-head housing at the bottom, and supported at the top through a bearing in a bracket attached to casting *M*. The latter is mounted on and rotates with the turret. Housing *B* is adjustable for work of various lengths. Handle *L* is used in raising and lowering the work holding center.

Each unit is equipped with an individual pump for delivering coolant to the hob, and the base of the machine serves as a reservoir for all pumps. Double row ball bearings are provided on most shafts and the thrust bearings are incorporated where necessary. All shafts are of carbon steel and gears are heat treated. The machine weighs 16,000 lb. It was designed by L. A. Sommer.

Improves Line of Geared-Head Lathes

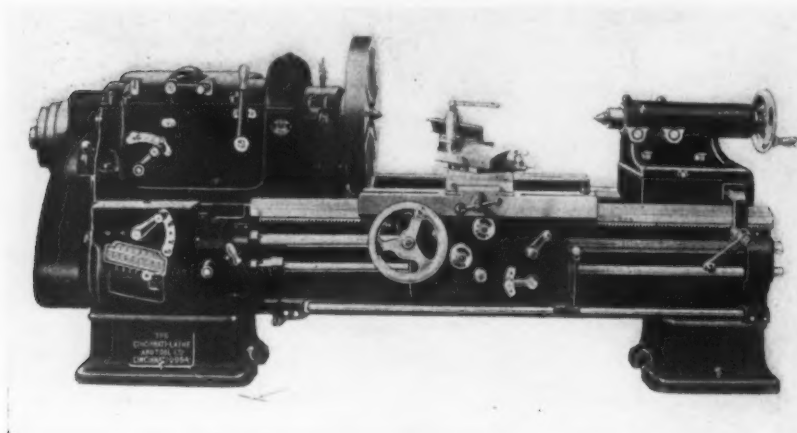
The Cincinnati Lathe & Tool Co., Cincinnati, is offering an improved geared-head lathe in sizes from 16 to 30 in. The 30 in. machine is shown in the accompanying illustration.

Twelve spindle speeds ranging from 9 to 325 r.p.m. in geometric progression are available. All of the gearing is in one housing. Lubrication is by means of the splash system and an indicator is provided to show the level of oil in the lower part of the head. The interior of the headstock may be inspected through an opening in the top of the cover. A spindle control lever is provided on the right-hand end of the apron, or a lever at the headstock may be used to start and stop the

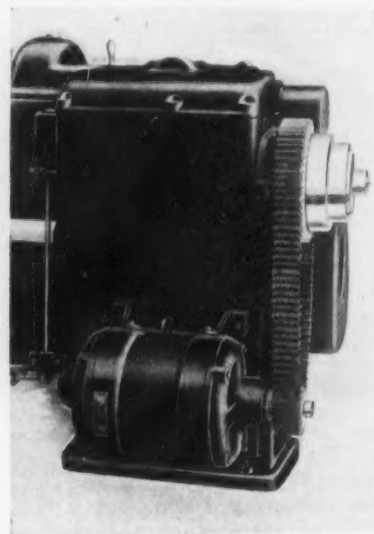
Belt and gear drive arrangements are also available. The driving pulley is supported so as to eliminate overhang strain on the drive shaft, and an oil reservoir between two brass bushes is intended to keep the pulley well oiled at all times. A 10 hp. 1200-r.p.m. motor is recommended for the 30-in. lathe, which with 12 ft. bed weighs 10,200 lb.

Wet-Process Enamels for Cast Iron

Wet-Process enameling of cast iron is becoming important because of its application to the enameling of stove parts, sanitary fittings and hardware. Tech-



Twelve Spindle Speeds from 9 to 325 R.P.M. Are Available and the Quick-Change Gear Device Incorporated Gives 32 Changes of Feed or Thread. The driving motor may be mounted on the headstock or attached to the rear of the cabinet leg as shown at the right, both being self-contained and driven by silent chain. Lubrication of the headstock is by the splash system



lathe. A lever at the top of the head may also be provided. The headstock bearings are of bronze and may be adjusted without removing the cover. A plunger is provided at the front of the head for locking the face gear when frozen chucks or face plates are to be removed.

The quick-change gear device incorporated gives 32 changes of feed or thread, the changes being made by shifting two levers. Two direct motor drive arrangements are available. In one the motor is mounted on the head, with the center of the motor near the center of gravity of the lathe. In the other the motor is placed near the floor underneath the overhang of the head and attached to the rear of the cabinet leg. Both are self-contained and driven by silent chain.

nologic Paper No. 246, which may be obtained from the superintendent of documents for 10c. a copy, is a report of an extended investigation which the Bureau of Standards has carried out of wet-process enamels for cast iron, both with and without the use of a ground coat. Compositions used in dry process enameling have served as a basis for the work. The effect of varying methods for preparation of frits, mill additions and relation of composition of the enamel to such properties as adherence, texture and capacity have been carefully studied. The paper describes the various ground coats, cover enamels, single coat and colored and white enamels which were tried out during the experiments and the compositions which gave the most satisfactory results are indicated.

Improves Large Boring and Turning Mill

The 100-in. double-driven vertical boring and turning mill illustrated, built recently at the Betts Machine Works of the Consolidated Machine Tool Corporation of America, Rochester, N. Y., incorporates improvements over former Betts machines of this class.

A feature emphasized by the makers is the powerful drive, accomplished by means of two spur pinions meshing with an internal gear of wide face and coarse pitch. These pinions are keyed to their shafts so as to mesh evenly with the table gear, with full bearing on both pinions, and being located on opposite sides of the gear, a smooth drive is said to be provided. The table is of extra thickness and is mounted on a long spindle, which is provided with taper bushings for the adjustment of wear in both top and bottom bearings. Automatic lubrication is provided.

The saddles and tool spindles have eight feeds, which are independent for each side of the machine. Feeds are obtained through sliding steel gears and may be changed while the machine is running. The power rapid traverse to the saddles and tool spindles is driven by motor on top of the machine, the same motor being used for raising and lowering the crossrail. Idle running shafts or gears have been eliminated, as the traverse mechanism is not in motion except when power rapid traverse or crossrail elevation is desired. The feed and power rapid traverse are interlocked by a cam arrangement.

The power rapid traverse and feeds may be engaged, disengaged or reversed directly from the saddles by conveniently placed levers. Duplicate stationary levers are provided on each side of the mill for use when the crossrail is in a high position and an interlocking lever is provided at each end of the crossrail for selecting horizontal or vertical movement. Feeds and power rapid traverse are reversed by means of friction clutches. Crossrail feed screws and elevating screws are equipped with roller bearings for taking thrust. Adjusting miters, graduated in thousandths, are carried on each saddle convenience in making final hand adjustments.

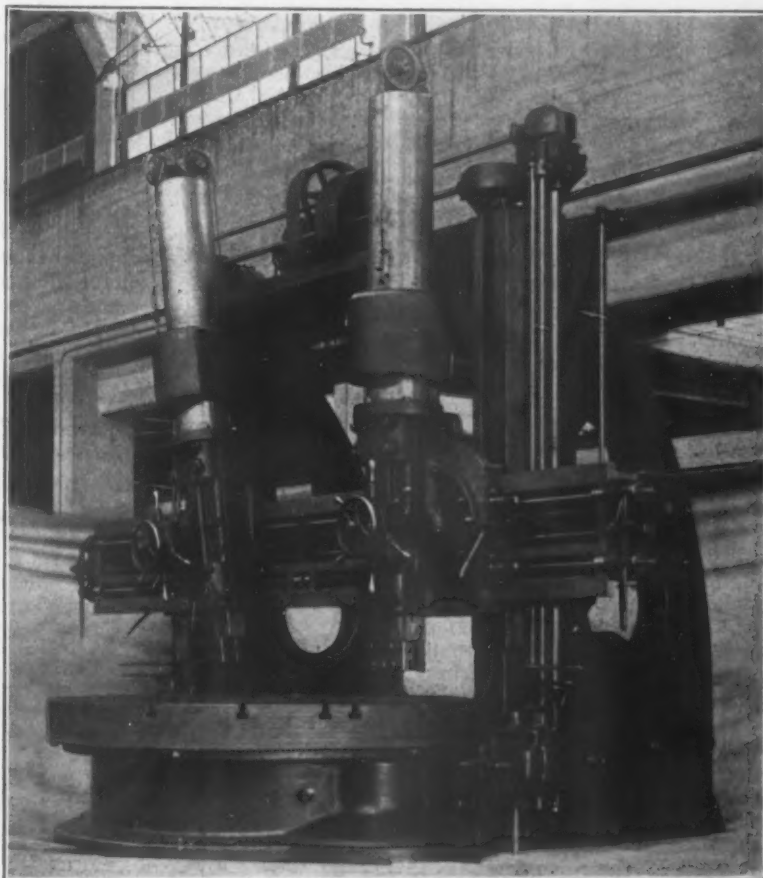
The tool spindles are counterbalanced by ring-type counter-weights. The tool spindles have a friction locking device operating the rack pinion, permitting the operator to raise or lower the spindle quickly by hand, if desired, in addition to the power rapid traverse. The crossrail has a wide face, is provided with narrow guide and is carried back between the uprights. The crossrail is clamped to the upright flanges both inside and outside.

The driving motor is direct connected through gearing to the speed box. On a. c. driven machines 12 table speeds in geometric progression through hardened steel sliding gears are available, together with friction clutch and brake for starting and stopping the machine from either side of the mill independent of the motor. D. c. driven machines have three mechanical speed changes which in connection with the 3 to 1 adjustable-speed motor recommended gives a total speed range of 27 to 1. Field rheostat and dynamic brake in the motor controller, in connection with push button control, provides means of instantly stopping or changing speed.

Jacob D. Waddell, who recently acquired the Empire Mills, Niles, Ohio, from the Youngstown Sheet & Tube Co., has organized, in association with John T. Herrington, U. C. DeFord and others, the Waddell Steel Co., with a capital of \$600,000. It is expected that the new company will start operations in March.

Building Plant for Sintering Flue Dust of Buffalo Furnaces

The Buffalo Sintering Corporation, with works at Buffalo and offices at 86 East Randolph Street, Chicago, is building a plant for sintering the blast furnace flue dust from the Buffalo furnaces. It will be on the South Buffalo Railway near the Rogers-Brown and Donner Steel Co. plants, and will consist of a double-length Dwight & Lloyd sintering machine, with a daily capacity of about 350 tons per day of sinter. The officers of the company are: Eugene B. Clark, president; Walter S. Reed, vice-president and treasurer, and B. G. Klugh, secretary. The personnel is



Powerful Drive Accomplished by Two Spur Pinions Meshing with Internal Gear of Wide Face and Coarse Pitch Is a Feature

the same as that of the American Ore Reclamation Co. Mr. Clark is also president of the American Sintering Co., which for many years has sintered the dust from furnaces in the Youngstown district and is now building a plant of two large Dwight & Lloyd machines at Hubbard, near Youngstown. The Buffalo plant will be in operation before the end of the year.

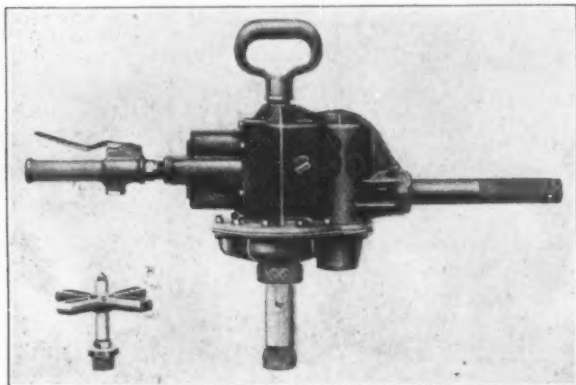
Electrification of Worcester Plants of American Steel & Wire Co.

The American Steel & Wire Co. is undertaking an almost complete electrification of its three plants in Worcester, Mass. Eleven steam engines in the North, South and Central Works will be scrapped and supplanted by Westinghouse Type CS electric motors with a total of 12,000 hp., ranging from 1 to 250 hp. for each motor. Through a special 10-year agreement with the New England Power Co. each plant will be supplied with three independent power sources, a triple protection against interruption of the operation of the mills. Power will be received at 13,000 volts and stepped down by transformers to 550 volts for the motors. Oil circuit breakers and switching equipment for the distribution of this power have been ordered from the Westinghouse company.

Portable Air Drill for Reaming Service

A portable air drill, which although not revolutionary, is regarded as a departure from the usual air drill construction, has been placed on the market by the Chicago Pneumatic Tool Co., New York. Ability to handle a constantly fluctuating load, especially adapting the machine to reaming service, is a feature emphasized.

The new drill is designated as the No. 36 Red Giant. It weighs 35 lb. which is light enough perhaps to class it as a one-man tool for down or side hole reaming. Balance, resulting in ease of handling, is a feature emphasized. The spindle is of the extension type and is provided with tang slot for convenient ejection of the reamer or drill. The connecting rods are attached to the crosshead by a wrist pin, obviating the use of a connecting rod toggle. The cylinders are of the double-acting type and are provided with a packing gland to prevent leakage of air into the crank case. The pistons



Portable Piston Air Drill Designed for Reaming. The weight is 35 lb. Balance and ease of control are features

are also of double-acting type, and are turned from low carbon steel bars and ground to size. Each piston is provided with two packing rings. The arrangement of the cross head and guide is intended to prevent side thrust against the pistons and to minimize cylinder wear. The eccentrics are integral with the crankshaft, being located between the crank pins or throws.

Valves are of the balanced piston type, and being balanced in all directions do not require pressure to hold them to their seats. It is claimed that moving but 1/20 of their length and having no rocker arms and gears, they require no appreciable power to operate them. The valves are located between the cylinders with short parts, providing air control as close to the cylinders as possible, a feature emphasized as providing maximum economy in use of air.

The crankshaft is a nickel-steel forging and is heat treated. It is mounted on three ball bearings, the third bearing being provided to assure proper shaft supports on both sides of the main drive gear. The crank pinion and ball gear are of stub tooth type. Splash lubrication is employed.

New Standard Samples

Phosphate rock, sample No. 56; refined silicon No. 57; 75 per cent ferrosilicon No. 58; 50 per cent ferrosilicon No. 59; low carbon, ferrovanadium No. 60; high carbon ferrovanadium No. 61, and manganese bronze No. 62 are now being issued by the Bureau of Standards with provisional certificates.

Fifteen establishments sold 91 automatic stokers in January, with a total of 66,492 hp., according to a report of the Department of Commerce, Washington. This compares with 73, of 32,517 hp., in December; 145, of 83,270 hp., in January, 1923; and with a monthly average of 122, aggregating 60,870 hp., in the 12 months of 1923.

Business Conditions as Reflected in Coal Consumption

Based on the National Association of Purchasing Agents survey of coal consumed during January, the volume of business increased 21.7 per cent as compared with the preceding month.

Of the total number of reports received from consumers of industrial coal for January, 62 per cent indicated increases in business, 25 per cent remained stationary and only 13 per cent showed decreases, as compared to the preceding month.

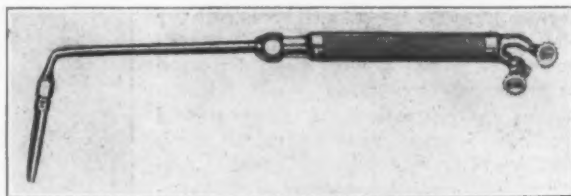
In considering these percentages, the slackening of business during December due to stock taking, and the holiday season should be taken into account, says the association. The showing for January, however, is such as to make the outlook good and February will probably show further gains.

The stocks of hard and soft coal in commercial consumers' bins on Feb. 1, 1924, were approximately 262,000 tons smaller than on Jan. 1. Based on the rate of consumption in January, the stocks on Feb. 1 were sufficient to meet the industrial requirements of the United States and Canada for a period of 50 days on the average. Although the stocks on Feb. 1 and Jan. 1 were approximately the same, the consumption during January, including coal used for industrial heating, increased about 8,720,000 tons, as compared with the preceding month, resulting in a lesser number of days' supply on hand Feb. 1.

January shipments of steel-furniture stock goods, based on reports received from 22 manufacturers, by the Department of Commerce, amounted to \$1,592,338 as against \$1,455,836 in December, and \$1,362,470 in January, 1923.

New Line of Goose-Neck Welding Torches

A new series of goose-neck welding torches, which among other features is guaranteed against flashback, has been placed on the market by the Bastian-Blessing Co., 246 East Ontario Street, Chicago. The two tube



New Goose-Neck Welding Torch for Heavy Work. Three extensions and 10 tips are available

angle torches heretofore offered by the company will also be continued.

Other features include the elimination of mixing in the handle and the elimination of the necessity of constant change of mixing chambers. Tips are of nickel-copper, are taper drilled to develop long neutral cones, and are conveniently interchangeable.

The torch illustrated is the model GL, which is intended for large shops having a wide range of work. The equipment available includes three extensions and 10 tips for a range of work from the heaviest preheated job down to light sheet metal work. The torch itself is 13 in. long, and the extensions are 6, 12 and 24 in. respectively. The series includes also a model GM torch for work up to 1 in. on iron, steel, copper, bronze and aluminum, being adaptable to pipe welding, automotive repair and production, tank and other medium work. The length of this torch is 20 in. and the weight 25 oz. Six tips and two extensions, 6 in. and 12 in. long, may be provided. A model GS torch for light production work such as the welding of small tanks, fenders, electrical parts and other parts up to 5/16 in. is also available. This torch, 14 in. long, weighs 15 oz.

The City Council, Owensboro, Ky., plans improvements to its water system, to cost in excess of \$90,000, and will purchase 21,100 ft. of cast iron pipe with special fittings.

Cooperation Through Plant Publications

Promoting Mutual Interest the Mission of House Organs—
Sincerity Essential—Editor Must Know His Readers
—Selection and Treatment of Material Discussed

BY W. R. R. WINANS*

THE printing presses throughout the country are turning out an ever increasing number of employee publications, or house organs. Some of these are modest and inexpensive consisting of two to four sheets, while others are the last word in the printing art. The fact that these publications are constantly increasing in numbers is significant. Experience has shown that they have become popular with the employees and have served a useful purpose in organizations where elaborate schemes to better employee relations have failed. For this reason it is well worth the while of any business executive to investigate the advisability of promoting such a publication, or if one already exists to give it the attention which it should receive as an important agency to better employee relations.

It is impossible to lay down a fixed set of rules or standards to cover employee publications. The specific conditions in each individual instance are different and these are the elements to be taken into consideration in formulating the plans and rules for the particular publication. There are, however, basic and elementary principles to be considered which are general factors and apply in most cases.

The real purpose of any employee publication is to make industry or business more human. The tendency in industry is to give more thought to the man factor in production. It is only natural, therefore, that some publications should be devoted to the human side of industry and it is only fair that this subject be given some consideration, especially when subjects covering materials and money have countless volumes and publications bearing thereon. The real purpose, then, of the employee organ is to make industry more human; indeed this must be the purpose if the publication is to succeed. Powerful as these organs may be they cannot make an inhuman employer appear human to the employees and they cannot take the place of sound principles of management in dealing with the men in the organizations. The mission of the employee paper is to promote the mutual interests of employer and employees, it is the official organ of cooperation. It must be sincere in motive, for what Lincoln said about fooling the people applies with great force to the employee publication; it is impossible to fool the men and an editorial policy which proposes publication of anything but the honest facts is sure to lead to a dismal failure.

The employees must be sold the paper, just as truly

*Editor *South Hill Echo*, an employee publication issued by the Morse Industries Association, which includes employees of the Morse Chain Co., the Thomas-Morse Aircraft Corporation, and the Peters-Morse Mfg. Corporation, all of Ithaca, N. Y.

as they must be sold subscriptions to any other publication. Accordingly, the salesman's methods must be followed and the first step is to secure interest. A method which proved successful in securing interest was the running of a name contest through which the publication was named. Obviously, this must be conducted early in the life of the paper. A great many employees will enter suggestions in a name contest, not only through a desire to win a prize, but because of the human desire to participate in a contest. Interest

will be secured through such a contest for the employees will feel they have had some part in starting the publication, it will become *their* publication to some extent.

Holding the employees' interest is the big problem and requires care in all departments of the paper. It must be accomplished through a careful selection of the material published.

The personals can be secured through a staff of departmental reporters. The men in the foundry enjoy reading news items concerning the activities of men in the assembly department, and so on throughout the whole plant. The new employee appreciates mention in the personals when he begins his new work. Of all things important, there is one "don't" in writing personals and that is:

"Don't indulge in recording jokes on individuals." It is impossible to determine how sensitive a man may be, and it is dangerous to hold any one up to ridicule; in so doing the good accomplished in many issues may be counteracted. Recognizing old employees not only pleases the individuals concerned, but shows the newer employees that the concern knows who are the old men that have been on the payroll over a period of years. It indicates interest in the individuals and has a strong appeal to the employees in general. Regarding the writing up of promotions there is a division of opinion among editors as to the value of such personals. Some editors hold that considerable publicity should be given to all promotions; others call attention to the fact that whenever a promotion is made there are always those who, doing the same work, feel that they were better entitled to the advance than the one favored. The editors in the last mentioned group feel that but little publicity should, therefore, be given to promotions. There is a middle ground opinion which favors giving mention of the promotions, but to avoid stressing or spreading in the story. In this manner the man promoted feels he is being recognized, as he should be, and the others will have no cause to resent undue publicity or praise.

Employee affairs make interesting subject matter for articles. The activities of employee clubs, the athletic association, glee club, and employee affairs as

EMPLOYEE publications or house organs are being increasingly used as a means of bettering employee relations. Like other mechanisms, however, they are of value as the motive behind them is sincere, and as they are fitted to the particular organization, and conducted in a manner that holds interest. Basic principles to be considered in planning such a publication, and an outline of the kind and proper handling of items that will keep it sold are given in this article by Mr. Winans. He addresses himself not only to executives not using house organs, but also to those who do and who are perhaps not giving them the attention they should receive as an agency to better employee relations.

socials, dances and entertainments furnish news stories or articles that will interest every employee.

Articles concerning the company's products, the uses and services rendered by the products, tend to increase the employees' pride in the output of the concern and unconsciously they endeavor to better the quality of their work.

Value in Discussing Problems of the Business

Many of the misunderstandings between employer and employees result from a lack of knowledge of each other's problems. The employee publication can do much to bridge the gap through articles and stories stressing the mutual problems and aims, the relation of dividends to wages, the relation of one man's pay to the other man's cost of living, and the changeless and unbending economic laws governing all men's lives. If the management will be frank with the employees and let the men on the inside of some of the problems of the business the relations may be considerably improved. Absolute honesty must be the rule and no attempt must be made to mislead or to exploit the workers through the columns of the publication. Cooperation and mutual trust is the goal of relations and the stabilization of industry and elimination of strife depend on the attainment of this goal. The employee publication is one of the biggest agencies for accomplishment of this aim.

Safety and accident prevention are subjects not to be overlooked in the organ. The greatest annual loss to industry is through accidents, to reduce accidents is to lessen the cost of doing business and to increase the wages it is possible to pay the workers. Great care should be exercised lest these subjects be overworked and the employees become fed-up on safety first and accident prevention propaganda. Articles telling of accidents to employees can be carefully written to point out the economic loss through accidents in industry and to show the advantages to all through a reduction in the number of casualties.

A worthy aim of any publication is to increase thrift, savings, home-building and wise investments, and to point out the value of insurance.

In a diplomatic manner the organ should attempt to quicken the patriotism of the readers. The duties of citizens should be called to the attention of the employees through the columns of the paper. The writer even went so far as to cause to be posted placards calling attention to registration days and urging the men to vote at election this fall. The publication which fails to endeavor to raise the standard of citizenship is overlooking a duty not only to the company, but to the nation as well. This is not merely a wartime duty.

A humorous column or department will be enjoyed by all, but even this department must be carefully edited. Above all the jokes must be clean; the best rule is to remember that this paper is to be read by the whole family.

Educational articles may show employees how to do their specific tasks better, inspire them to read or study, and may cover a wide field extending into subjects pertaining to the production of raw materials, tools, etc., purchased and used by the employing company. The scope in this branch is almost unlimited and depends to a considerable extent upon the readers.

Handling of General News and Editorials

General news articles or stories may concern items of community interest, company activities, plant extensions, addition of new machinery, new processes or methods. In stories pertaining to new machinery, automatic machines, new methods or processes an attempt must be made to answer the question which immediately enters the minds of the employee as to how it affects his well-being. The history of industry records the substitution of machine methods for hand labor, but always the ultimate result is that the worker's position has been bettered. Nevertheless the question continues to be asked by the employee when changes are made of the nature mentioned above. To meet these questions and to relieve the mental anxiety of the men is important.

The editorials must be broad gaged, liberal and fair. Attempts at high-brow writing will not meet with success. The "we" attitude properly and sincerely handled will attain results. Naturally, the editorials must be guiding, and are intended to shape opinions, but they must lead in a reasonable manner and show sincerity of purpose. An editorial hastily and carelessly written is worse than none at all.

In some instances the employee publication may be one of the undertakings of the employee association. In fact, publications so conducted are very successful, as the employees feel that such a paper is their own and any suspicions as to management dictation is eliminated to some extent. In these cases the cost of publication may be shared with the management. In addition a limited amount of advertising may be carried. A word of warning may be proper in this connection. Advertisements should be of a very high character, such as of banks, savings and loan or building and loan associations, insurance companies, and of concerns of high standing in the community.

General Make-up Important

The individual case will determine whether the publication should be magazine or newspaper style. The matter of cost will also have some effect in making a decision. The general make-up is more important than the style. Every effort must be made to make the organ attractive and inviting to the readers. Typographical sameness of the pages must be avoided, that is the different pages must not have the same general appearance at a distance; boxes, changes of heading style, photographs, cartoons, etc., can be used to advantage. In this connection it is well to state that a live-wire staff photographer will be a great help in putting snap into each issue. All articles should be made as short as possible. A page made up of several short articles has a stronger appeal to the reader than a page of unbroken columns. When long articles cannot be avoided it is well to use subheads generously. In some cases one long article will make two good shorter articles.

An important rule, as in newspaper work, is to use simple understandable language—no reader will stick if he has to read with a dictionary at his elbow. The next rule, also a newspaper axiom, is tell the main points of the story or article first, and then go into details. News stories must not be written after the fashion of a novel, there is no leading up to the main point, it must be told early. The opening of each story must be snappy and interesting.

It is advisable to check up on reader interest by publishing a coupon, at intervals, on which the readers are asked to indicate whether they enjoy reading the organ, and to indicate what departments or kinds of articles interest them. A small percentage will take the trouble to fill out the coupons, but many helpful suggestions and criticisms can be secured in this manner.

The selection of the printer cannot be given too much thought and investigation, assuming that the organization does not maintain a printshop equipped to handle the work. The printer who handles the work can do much to assist the editor; he can give many suggestions of value, and make helpful constructive criticisms. The printer finally selected should be the one who is the most anxious to do the work and one who it appears will take an active interest in the publication for its own sake.

In small concerns where no publicity department is maintained the editor of the house organ should keep in close contact with the local newspapers and news stories should be released to the papers through the house organ editor. The local editors will generally be found willing to cooperate with the plant editor to the fullest extent in this matter.

Editor Not to Be Hampered by Censorship

In the final analysis a great deal depends on the editor. He must be the final judge and jury of each and every item and article that goes into the publication, and it is his brain that must produce many of the articles and the editorials, which will be far-reaching in

effect. His is no small task and the individual selected for the position must know and understand his readers. He must keep in close touch with them. The editor should not be hampered by any petty censorship of the management. It is the duty of the management to exercise great care in choosing the editor and once having made a selection to explain frankly the real ideals of the management in employee matters and then leave the responsibility of editing the publication entirely in the hands of the editor. The editor must have the material and moral support of the management in the undertaking. If it is possible, it is desirable to choose the editor from among the employees of

the organization. Such a man will have the spirit of the organization and a knowledge and understanding of the men that an outsider could not be expected to possess. There may be no one available, but it is a point to be considered and only in the last attempt should an outsider be employed.

It would be impossible in an article such as this to cover the entire subject of employee publications; the field is too large and each case has its own problems. New ideas are constantly being developed and the editor will find many useful ideas and suggestions will be gained through perusal of publications to be secured through a good exchange list.

Stainless Iron, Its Manufacture and Properties*

Effect of Cold Working and Heat Treatment—Suitability for Engineering Uses—Resistance to Corrosion and High Temperature Oxidation

STAINLESS iron is produced in the basic-lined electric furnace. Before adding the chromium alloys, the carbon content of the bath should be reduced well below 0.10 per cent, and afterwards precautions taken to avoid contamination with carbon, which is greedily absorbed by the molten material. Because of its greater softness, stainless iron forges more easily than the harder varieties of stainless material; it works

floor or in a drafty place. Should any trouble arise, owing for example to intricate shapes in drop stamping, all danger of cracking may be removed by recharging the hot forgings into a furnace maintained at 650 to 700 deg. C. and allowing them to soak for about 1 hr. after they have attained the furnace temperature. By so doing the carbon change takes place and the forgings, being then in the annealed condition, may be withdrawn from the furnace and air cooled without danger.

Suitability for Engineering Uses

The suitability of any material for engineering purposes is judged, to a large extent, by its mechanical properties and the type of the latter desired depends

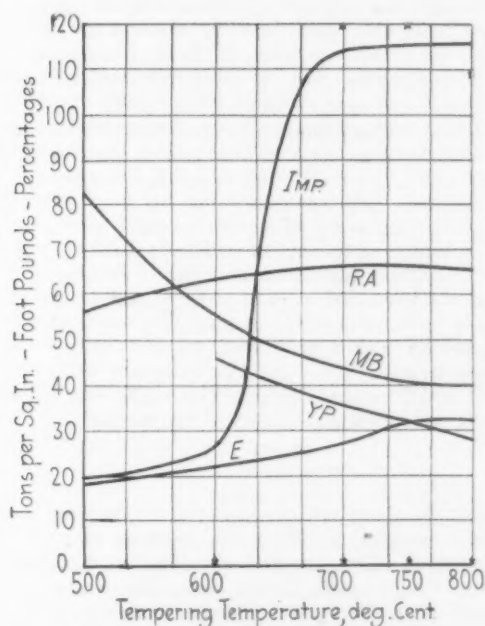


Fig. 16—Mechanical Properties of Stainless Iron, 0.07 C, 11.7 Cr, 0.08 Si, 0.57 Ni, 0.12 Per Cent Mn

probably as easily as ordinary steel containing about 0.40 per cent carbon and hence may readily be forged, rolled, or drop stamped.

Stainless iron does not air harden so intensively as the higher carbon varieties. It does air harden, but the degree of hardness produced is considerably less, being generally in the range 280 to 380 Brinell instead of 450 to 550 as obtained with a steel containing 0.30 per cent carbon. Hence it is much safer to work and heat treat than the higher carbon varieties; it is much less liable to develop hardening cracks so that, in general, it may be air cooled after forging without danger. Reasonable care, however, should be taken; for example, forgings should not be thrown on a wet

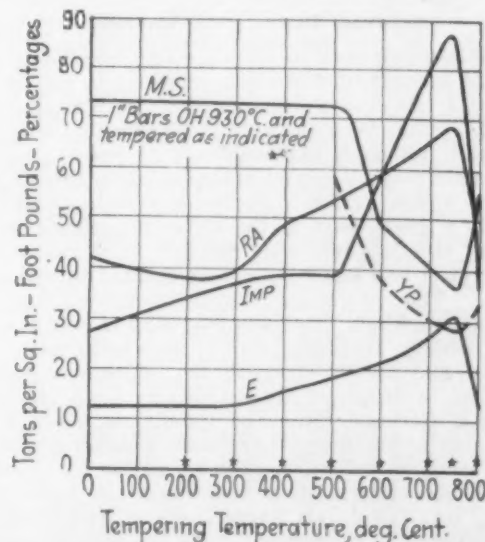


Fig. 17—Mechanical Properties of Stainless Iron, 0.10 C, 11.5 Cr; Bars 1 1/2 In. Dia., Oil Hardened at 960 Deg. C., and Tempered

on the purpose to which the material is to be applied. The results obtainable from stainless iron after oil hardening and then tempering at varying temperatures are typified in Figs. 16 and 17, which show the results on material containing respectively 0.07 and 0.10 per cent carbon; the former hardened to approximately 73 tons tensile strength and the latter to 85 tons. Both were heated in the form of bars 1 1/2 in. in diameter but results of the same order would be obtained with bars of considerably larger size. The tensile test pieces were the British standard size (2 in. by 0.564 in. diameter). The impact tests were obtained with an Izod machine, the test pieces being of standard size (10 mm. sq.) and having the standard V notch. The tests in Fig. 16 were obtained on the first cast of stain-

*Abstract of a paper "Stainless Steel With Particular Reference to Its Milder Varieties," presented before the New York meeting of American Institute of Mining and Metallurgical Engineers, Feb. 19. The author, John H. G. Monypenny, is chief of research laboratory, Brown Bayley's Steel Works, Ltd, Sheffield, England.

less iron produced commercially. For such steels, a temperature of 950 deg. C. is recommended for hardening. It is sufficiently high with material of normal composition to insure solution of the ferrite and carbide and thus give a homogeneous martensite on quenching.

The fall in tensile strength produced by tempering at successively higher temperatures is what would be expected from the Brinell hardness results given earlier. Up to a temperature of 500 deg. C. there is little or no reduction in tensile strength, while the test piece shows increased ductility due, at any rate in part, to the relief of stresses set up during hardening. Between 500 and 600 deg. C. the hardness falls quickly, while from 600 to about 750 deg. C. it falls slowly and steadily. The very slow rate of fall in tensile strength with increase of tempering temperature in the range 600 to 750 deg. C. is very useful, commercially, as it permits quite a wide range of temperature to be used when a number of articles have to be tempered to produce a given tensile strength, obviously a desirable thing. On the other hand, the comparatively rapid fall of hardness in the range 500 to 600 deg. C. makes the difficulties of tempering in this range correspondingly great.

In the annealed condition, the material has a somewhat lower tensile strength than after hardening and tempering and a much lower yield point, as will be seen from the following tests of two typical casts:

Yield Point, Tons per Sq. In.	Maximum Stress, Tons per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent	Izod Impact, Ft.-Lb.
20.2	34.1	39.0	72.0	92
20.8	35.2	35.0	66.8	68, 60

Comparing these with values plotted in Figs. 16 and 17 shows that they bear the same relation to the latter that a normalized test on an ordinary mild steel does to a hardened and tempered test on the same steel. Tests at temperatures above atmospheric show that, in the range of temperatures likely to be met with in the use of superheated steam, stainless iron retains its tensile strength very well.

Behavior Under Cold Working

Stainless iron may be readily cold worked and, provided the amount of distortion produced is not unduly great, the resistance to corrosion is not seriously affected. It has been successfully drawn into wire and tubes and, although more difficult to draw than ordinary mild steel, is considerably better in this respect than the higher carbon varieties of stainless material. Probably a great part of the difficulty consists in the fact that stainless iron does not flow in the same way as mild steel and hence cannot be treated in the same fashion. The procedure during drawing must be modified somewhat. Stainless iron may be cold pressed into a variety of forms with considerable ease. Its hardness and tensile strength are, of course, greater than that of some metals extensively used for sheet work, *e.g.* German silver and aluminum, hence it requires heavier pressure. If the sheet is distorted, during the pressing operation, to such an extent as to affect seriously its rust-resisting properties, the latter may be fully restored by air hardening and tempering. If this treatment is carried out when the greater part of the cold-working operation has been performed and the article subsequently pickled to remove scale, the piece can be given the final pressing which will brighten up the dull pickled surface and thus materially assist any final polishing operation. This method may obviously be applied in other cold-working operations, *e.g.* bright drawn wire, cold-rolled strip, and the like. The small amount of distortion produced by the final cold-working operation will have a negligible effect on the resistance to corrosion.

For general engineering work, where material of about 40 tons tensile strength is required, there is little doubt that stainless iron is the most suitable form of stainless material to use. It drop stamps quite readily and is easily machined. It has been used for such widely diverse purposes as turbine blades, golf clubs, spoons and forks, bonnets and other fittings for

motor cars, ornamental firegrates, spurs and many other articles. Because of its low carbon content, its resistance to corrosion is affected less by varying heat treatment than the higher carbon varieties. Thus, in its fully softened condition, it is stainless to the vinegar test even when the chromium is lower than is customary in stainless material, 10 to 11 per cent.

Its Corrosion Resistance

The general character of the resistance of stainless iron to various corroding media is similar to that of stainless steel except that it possesses three properties (under similar conditions of treatment, etc.) to an unchanged degree owing to the smaller amount of chromium locked up in the carbide. The author treated this part of the subject in some detail in a paper² contributed to the general discussion on "Alloys Resistant to Corrosion" held by the Faraday Society in conjunction with other societies at Sheffield on April 13, 1923. It is attacked readily by hydrochloric, sulphuric and sulphurous acids. It is practically unaffected by saturated or superheated steam, lubricating oils, petrol, benzol, paraffin, greases, etc.; it has therefore a very considerable future before it in engineering work, particularly with regard to hydraulic and steam service work.

The results of atmospheric corrosion depends on the location of the test. In towns, especially in the neighborhood of works, the atmosphere contains distinct amounts of acid and large amounts of dust, often ferruginous. Samples exposed for prolonged periods to such conditions become coated with a dark-brown coating, which however may often be rubbed or washed off leaving an almost unimpaired surface, at other times the coating appears to induce minute pits in the surface of the steel underneath, probably owing to the presence of small amounts of acid (sulphuric). In purer atmospheres (in country districts) stainless material will remain unattacked for long periods.

An important property of stainless material is that it resists oxidation remarkably well on heating to temperatures up to about 200 or 825 deg. C., even for prolonged periods. At temperatures up to about 700 or 750 deg. C., a series of temper colors are produced similar to those obtained on ordinary carbon steel but at much higher temperatures than with the latter material. Above 700 or 750 deg. C. up to about 825 deg. C., a polished surface of stainless steel or iron becomes covered with a gray film, without however losing its polished appearance, and the specimen neither gains nor loses weight appreciably. Above 825 deg. C., stainless steel or iron begins to scale appreciably.

The St. Louis *Globe-Democrat* is publishing a series of articles written by St. Louis leaders in steel, iron and associated interests, and compiled by the Mercantile Trust Co., on "St. Louis (and Its Future) as a Steel and Iron Center." Signed articles have been published so far by Festus J. Wade, president of Mercantile Trust Co., on "The Steel and Iron Industry"; Harry Scullin, president Scullin Steel Co., on "Steel: and the Destiny of St. Louis"; George W. Niedringhaus, vice-president St. Louis Coke & Iron Co., and president National Enameling & Stamping Co., on "Coke"; W. K. Kavanaugh, president Southern Coal & Mining Co., on "Cheap and Abundant Coal"; Leonard A. Busby, president Iron Mountain Co., on "Missouri Iron Ores," and L. W. Baldwin, president Missouri Pacific Railway, on "Reopening of Iron Mountain—Its Influence upon the Iron and Steel Industry at St. Louis."

The electrically operated flow meter put on the market by the General Electric Co. was designed to provide a means for measurement of the total flow of steam, water, air, gas, oil, etc., through pipes. Due to the electrical principle of operation, the indicating, curve-drawing and integrating instruments can be located any distance away from the pipe where the flow is being metered.

² The Resistance to Corrosion of Stainless Steel and Iron. Trans. Faraday Soc. (1923) 19, pt. 2

Interesting History of Tin Plate Manufacturing in the United States Told by William Banfield, Who Was Connected with the Industry from 1872 to 1924



WILLIAM BANFIELD, identified with the American tin plate industry from its early days, who recently retired from active business, has written at the request of THE IRON AGE a very interesting review of the growth of that industry since 1872, when he came to this country from England to join his father in the operation of the first tin plate mill built in the United States by Rogers & Burchfield at Leechburg, Pa. He says:

"William Rogers, the senior member of the firm, who received his training in England, had the courage to build the first tin plate mill in this country in 1872. In the spring of that year Charles Banfield, my father, emigrated to the United States and settled at Apollo, Pa., where the firm of Rogers & Burchfield had in operation two sheet mills. When he found out that a tin mill was built at Leechburg he sent for me to come to America, which I did in September, 1872. My father rolled the first heat of tin plate made in the United States and I was his heater.

"In 1873 two tin mills were erected in Demmler, Pa., and one in Wellsville, Ohio. Then came the panic of 1873, which made it a very hard struggle for the new enterprises to exist. The Wellsville mill was closed after one week's operation. However, the Leechburg company struggled along until 1874, when it failed. It was understood by the manufacturers at that time that there was a protective duty of $2\frac{1}{2}$ ¢. per lb. on tin plate. When the matter came up for decision the Secretary of the Treasury ruled that tin plate was pure tin rolled into sheets rather than the commercial article known as tin plate. Then tin plate was admitted upon a low ad valorem duty which did not give adequate protection for the manufacture of it here under our high plane of values and wages. The result was that the foreign article could be laid down in this country much cheaper than tin plate could be made here. This was in the days of iron, before soft steel was introduced, and required a great deal more skill and labor to produce than does soft steel, and, as wages were so much higher in this country than in Great Britain, the manufacture of tin plate was abandoned for some years. The Leechburg and Demmler mills now turned their attention to making high-grade sheets in small sizes for other uses, particularly for making stamping material for silver plating and other high-finished articles. No further tin mills were built in the United States until the McKinley tariff bill was enacted, which gave ample protection to the new industry.

"For many years the United States had been the largest consumer of tin plate. Many manufacturers in this country looked forward with longing eyes to the time when we could produce our own so that immediately after the passing of the McKinley tariff bill a number of enterprising people entered the tin plate business. Mills were built in many sections of the country. After the business became established, then came the tariff revision, during Cleveland's second administration, which again reduced the duty on tin plate to such a degree that stagnation gripped the in-

dustry. Tin plate sold as low as \$2.50 per box, which was below cost for the manufacture. The result was that the American Tin Plate Co. was formed and nearly all manufacturers of tin plate were glad to sell out to the combination to save their original capital. Today the United States is by far the largest producer of tin plate in the world, far exceeding Great Britain, which had possibly 75 years of a start on the United States.

"Tin plate is rolled today much in the same way that it was rolled 100 years ago. Great improvement, however, has been made in machinery, material and furnaces and, while today the industry uses more men per turn, there is a greater output with less exertion per ton per man.

"In the early days, tin plate mill production was very small, but during the life of my grandfather, Richard Banfield, a roller, it increased to 300 boxes per mill per week. Today a modern mill in the United States will produce 1600 boxes per mill per week.

"Today in the United States we have 607 tin mills which last year produced about 38,000,000 boxes with a value at present market of \$194,000,000. Tin plate mills make quite a tonnage of small black sheets; if all mills made nothing but tin plates the capacity of present mills would be about 48,000,000 boxes, based on average weight of 100 lb. per box.

"A change in the base material from iron to steel, which is produced at a very much lower cost and is very suitable for tin plate, came into general use prior to the passage of the McKinley tariff bill, and gave the manufacture of tin plate in this country a tremendous boost. The use of steel as the base for tin plate removed many of the difficulties which the pioneers had to contend with when making tin plate out of iron."

Mr. Banfield continued working at Leechburg for 13 years, rising from heater to manager of the mill under Kirkpatrick & Co., successors of Rogers & Burchfield. He then formed the company of Wallace, Banfield & Co., bought an idle mill at Irondale, Ohio, and erected two sheet mills there. When the McKinley tariff bill became effective, the sheet mills were converted into tin plate mills and two more mills were added. Wallace, Banfield & Co. continued to make tin plate until the American Tin Plate Co. bought them out. He then was appointed a district manager and remained with the American company for five years, having charge of six plants. In 1900 he organized a company and built the Chester Rolling Mill at Chester, W. Va., which was later sold to the American Sheet Steel Co., and still later sold to the American Tin Plate Co. and changed from sheets to tin plate. In 1904 Mr. Banfield joined the Follansbee Bros. Co. of Pittsburgh, as general manager, and superintended the building of both of that company's plants, one at Follansbee, W. Va., and the other at Toronto, Ohio. Many of the improvements in tin plate making were the result of his experience. He resigned his position in January of this year, feeling that 60 years in the manufacture of tin plate and sheets, iron and steel, were long enough for one man.

OPEN-HEARTH REFRACTORIES*

American Ceramic Society Discusses Chrome and Other Brick

Dr. D. A. Lyon, of the Bureau of Mines, acted as chairman of a symposium on the refractories for service in open-hearth furnaces and introduced M. C. Booze, senior refractory fellow at the Mellon Institute, Pittsburgh, who discussed the severe conditions under which fire clay brick are used in the open-hearth furnace, confining his attention to conditions encountered in the checker work of the heat regenerators. He brought out that the failure of refractories here was largely due to the eroding action of reducing gases carrying, in mechanical suspension, basic oxides derived from the slag. He also pointed out that the life of the refractory in the regenerator was to a great extent under the control of the furnace operator.

The next paper was a discussion of the use of silica brick in the open-hearth furnace by H. C. Harrison, of the U. S. Bureau of Mines, Ceramic Experiment Station, Columbus, Ohio. This paper outlined the conditions under which silica brick were used in the various portions of the open-hearth furnace, pointing out that these conditions were particularly severe in that they required an acid refractory to function in processes in which they were in contact with basic materials at high temperature. He considered the life of the silica roof a limiting factor in the operation of the furnace, the failure being due in most cases to fluxing away, and believed the average life to be 200 heats in basic practices and 700 to 800 in acid practice. He suggested that a roof of neutral or basic material was really the desirable one, but up to the present time most roof materials of this nature have not proved satisfactory in service. He considered there was a possibility in the suspended type of roof which might allow a partial replacement upon failure by proper use of water-cooled supports in the design. Some improvement in the service of silica brick was to be expected from the advent of machine molding and he believed this would be a good subject for further study by those interested in open-hearth refractories.

Mr. Harrison mentioned that carborundum, alumina and chrome brick have all been tried, but none have proved themselves as satisfactory as silica, although all of these materials are known to be more refractory and of less acid nature. Failure of refractory roofs constructed of these materials was largely due to their poor mechanical properties at the high service temperatures.

Chrome Brick

The next paper was an extemporaneous discussion of the application of chrome brick and chrome ore to the open-hearth furnace by R. E. Griffiths of the E. J. Lavino Co., Philadelphia. He believed that the use of chrome materials in the open-hearth had developed considerably in the last four years and that eight complete bottoms of chrome brick had been placed in service in the last three years as well as 231 furnaces in which some chrome brick was used in bottom construction. Other furnaces had used chrome in the back wall to replace silica with an increase in life of 4 to 6 times. He believed that 300 heats could be expected from a back wall constructed with this material. He mentioned another place having a complete bottom of chrome material with no magnesite and several others in which the common practice was to use a layer of chrome between the magnesite and clay bottoms.

Prof. Bradley Stoughton and C. A. Smith, of Lehigh University, next discussed the conditions met in the open-hearth furnace as affecting refractories and C. E. Williams, of the Seattle Station of the Bureau of Mines, also spoke in an interesting manner along this same line.

Sidney Cornell, New York, spoke extemporaneously

*Concluded from page 597, THE IRON AGE, Feb. 21. This is the last portion of the report of a symposium at the Atlantic City meeting of the American Ceramic Society.

from a prepared paper on refractory applications in open-hearth practice, and emphasized that the refractory engineer must always have in mind the limiting refractories cost which open-hearth steel can bear. He pointed out that there are a million brick in an open-hearth furnace and that it is useless to go ahead with the production of what have been called super-refractories, if these refractories when available are to cost several times the price of the materials available at the present time. Mr. Cornell also gave some very interesting figures on the number of shapes and sizes of refractories commonly used in the design of open-hearth furnaces and suggested that some progress could be made by the redesign of much of this material and consequent cut-down in the number of pieces required in the construction of large furnaces. He also believed valuable results would be obtained as regards service of refractories if manufacturers would follow the practice adopted by steel manufacturers in numbering the product of each heat. This would be comparatively simple where refractories are molded by machine and should yield information very valuable to both the refractory maker and furnace operator.

An interesting discussion of the papers followed and was participated in by several open-hearth furnace operators who were present, as well as technologists interested in the production of refractories. Radclyffe Furness, of the Midvale Co., Philadelphia, spoke in an interesting manner of the problems which he considered most pressing, and suggested that refractory makers could best serve the open-hearth industry by concentrating their efforts on the production of silica refractories of superior quality for roof construction and on materials for nozzles, which he considered the least satisfactory of any of the refractory materials in use at the present time.

The discussion soon resolved itself into a consideration of the silica roof and its construction and operating conditions which were encountered. Mr. Spangler brought out the fact that a heavy item of expense in open-hearth operation is the time lost during the minor repairs to the refractories.

While the meeting was an interesting one and much discussion of value took place, it was felt by many of those present that the results would be even more beneficial if the society had prepared reprints of the papers presented so that those attending could familiarize themselves with the material and have a better basis and more time for discussion. It is understood that in the future this plan will be followed and it can safely be predicted that it will meet with the approval of all those who are in the habit of attending the sessions of this division.

The sessions of the refractories division were continued on Feb. 7 in the form of excursions to plants devoted to the ceramic industry in the vicinity of Atlantic City.

Wear Testing of Metal

Some of the work which the Bureau of Standards has conducted on the determination of the wear of metals was described some time ago. At that time it was pointed out that a considerable difference in the rate of wear resulted when the abraded particles were removed from the test specimen and when these were allowed to accumulate. The device designed for cleaning the specimens during a run has been tried out and proved quite successful. The previous results as to the difference between rate of wear when the particles are removed and when they are not were corroborated. When these particles are removed the amount of wear is so small in some cases—two or three mg. per hr.—that it will be necessary to make runs of several hours duration in order to get comparative quantitative data.

Arthur G. McKee & Co., Cleveland, have been awarded a contract for designing and furnishing ore and scrap bins, coke bin, two scale cars and a McKee revolving distributor for the No. 1 blast furnace of the National Tube Co. at McKeesport, Pa.

Weirton's New By-Product Coke Plant

Recovery Plant for By-Products Is Designed for Future Expansion
to Triple the Initial Capacity—Results of Operation of
Coking Plant and of Blast Furnace

BY C. H. HUNT*

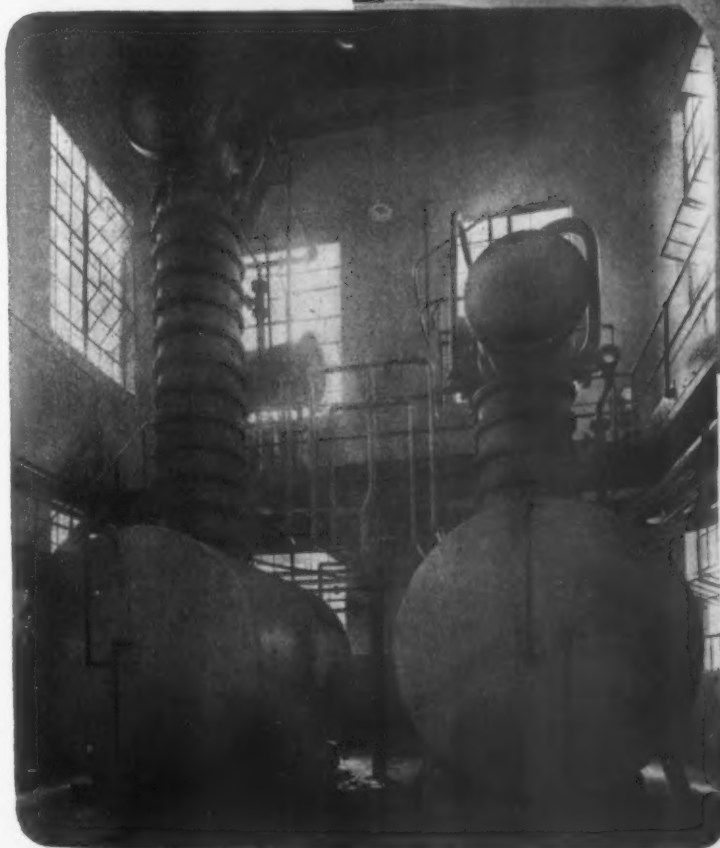
IN the by-product department, which is laid out parallel with the battery along the south side of the plant, the benzol department is located west of the by-product buildings adjacent to the river bank. All buildings and equipment have been constructed so that extensions can be made and apparatus added to handle gas from additional batteries of ovens when constructed, without delay to existing operations. The present equipment was designed for a capacity of 570,000 cu. ft. of gas per hour, and at the benzol plant for the conversion of 200 to 230 gallons of light oil per hour into pure products. The by-product building is 133 ft. long by 59 ft. wide and 32 ft. high to bottom

*Chief engineer Weirton Steel Co., Weirton, W. Va. This is the concluding portion of the article which appeared last week on pages 573 to 577.

chord of roof truss, 40 ft. of the west end being separated off by a brick partition to provide storage for ammonium sulphate.

One novel feature of the layout is the location of all by-product department pumps, service water pumps and air compressors in a room underneath the primary coolers, 42 ft. 6 in. long 19 ft. wide and 9 ft. 6 in. high, the walls and roof of which are extra heavy reinforced concrete with reinforced beam construction and pilasters under each cooler. This location of pumps was chosen to facilitate ease of extension to both ends of the by-product building, for the addition of apparatus on the east end and additional sulphate storage on the west end. The arrangement also has the advantage of simplifying and shortening the pipe lines to and from the pumps.

(Below) The Crude and Pure Stills in the Benzol Building. The coolers and receiving tanks are located on the platform in the rear. This benzol plant has been designed to convert into pure products 200 to 230 gal. of light oil per hr.



(Above) Interior of the By-Product Building, Showing Two Lines of Apparatus, One in Operation, One as a Spare. The exhausters are at the right; the sulphate drain table and centrifugal dryers are located on a platform at the left. This plant was designed for a capacity of 570,000 cu. ft. of gas per hr. The building measures 59 x 133 ft. x 32 ft. high

Gas from the collecting main at the ovens is drawn through the suction main into a 36-in. downcomer, connecting with the inlet header at the primary coolers. There are three primary coolers of the tubular type, two operating in parallel and one as a spare, in which the gas is cooled by contact with the water-cooled tubes from 185 deg. to 70 deg. Fahr. Taylor temperature controlled diaphragm motor valves maintain a necessary uniform temperature of the gas leaving the coolers, by controlling the amount of water flowing through the coolers.

About 90 per cent of the tar is condensed out of the gas by spraying with cool liquor in the collecting main and in passage to the coolers, while the lighter tar and water vapors are condensed in the primary coolers. This water carries with it about 20 per cent of the ammonia in the gas, forming what is termed ammonia liquor. The tar and ammonia liquor flow into a 20,000-gal. hot drain tank located north of the primary coolers.

Two centrifugal motor-driven tar flushing pumps, one held in reserve, located in the pump house, have a capacity of 670 gal. per min. each at 125 ft. head. These pumps circulate tar and ammonia liquor from the hot drain tank to the sprays in the collecting main. This circulating liquor returns to the hot drain tank the amount condensed out of the gas in the mains, which, together with the tar and liquor from the primary coolers and tar extractors, is pumped by either of two motor-driven centrifugal ammonia liquor pumps, of 100 gal. per min. capacity at 75 ft. head, to a separating tank of 45,000-gal. east of the by-product building, where the tar is separated from the ammonia liquor by difference of specific gravity, the ammonia liquor flowing to the weak liquor 70,000-gal. storage tank, for further treatment, and the tar into a 300,000-gal. storage tank, from which it is loaded into tank cars for shipment or for use as fuel at the steel plant.

The hot drain tank is located above yard level with steel platform level with the top around the pitch traps and strainers, so it can easily be kept clean, instead of in a pit below yard level. This eliminates one of the unsightly places around the coke plant, and allows the tar flushing pumps to operate with suction head and be located above floor level in the pump house, which is only 18 in. below yard level. Therefore, to receive the drain from the tar extractors, reheaters and exhausters, which are at floor level in the by-product room, and also the overflow from the tar and ammonia tanks, etc., a 3000-gal. concrete condensate drain tank is provided below yard level, with two 6 x 5½ x 6-in. horizontal double-acting steam pumps, one being a spare, controlled by a float in the condensate tank for transferring the tar, etc., to the hot drain tank.

All pipes for tar and ammonia liquor are laid in covered concrete trenches, which drain also to the condensate drain tank, thus draining leakage or spillage from pipes or apparatus.

There are two lines of apparatus in the by-product room, one with sufficient capacity to handle all of the gas, the other held in reserve. The exhausters are of the positive type, having a capacity of 11,700 cu. ft. per minute at inlet temperature of 1100 deg. Fahr., and designed for a suction of 10 in. of water and a discharge pressure of 2½ to 3½ lb. They are driven by 16-in. x 22-in., four-valve, non-releasing Corliss engines, 135 to 175 r.p.m., designed to operate against 15 lb. back pressure or atmospheric exhaust.

Removal of Gas

The gas is drawn from the ovens through the mains and coolers by the exhauster and then driven through a rigid three-bell type tar extractor, where any tar remaining in the gas is taken out, and then on through the by-product apparatus with sufficient pressure to deliver it back to the gas holder and to the ovens at the required pressure.

From the tar extractor the gas passes through a tubular reheater and is preheated by contact with the steam-heated tubes to a temperature of approximately 140 deg. Fahr. The gas then enters a 10 ft. diameter lead-lined saturator and bubbles up through a 5 per cent solution of sulphuric acid, the ammonia in the gas

uniting with the acid and precipitating to the bottom of the saturator, which has the shape of an inverted cone, from which it is lifted by an air injector on to a lead-lined drain table, the acid draining back into the saturator. The sludge of salt crystals and acid is then whirled in a perforated cylindrical dryer, forcing out the remaining acid, which flows back into the saturator. After being washed with a small quantity of hot water and whirled until dry, the white soft crystals are scraped from the cylinder by mechanical salt cutters and dropped into buggies, below the platform on which the drain table and dryers are located, ready for storage or shipment.

The weak ammonia liquor is delivered from the storage tank, by one of two motor-driven centrifugal pumps having a capacity of 100 g.p.m., to the ammonia still, where it is mixed with milk of lime and heated by steam. This drives off the ammonia as a gas, which is piped into the gas main just before it enters the saturator and converted into ammonium sulphate.

From the by-product building the gas is piped to the benzol washers, first passing through the final cooler of the hurdle type, 8 ft. in diameter by 70 ft. high, sprayed with water, which cools the gas from 120 deg. to 70 deg. Fahr. and removes the naphthalene, of which very little is encountered with narrow ovens and rapid coking. To maintain the gas at a constant temperature, a Taylor controlled valve admits the proper amount of cooling water through the inlet line. The gas then passes in series through two washers 10 ft. in diameter by 100 ft. high, containing wooden hurdles for about 85 ft. of their height. As the gas flows upward through the hurdles, composed of wooden slats set on edge, a petroleum wash oil is sprayed in at the top of the washer, running over the entire area and surface of the hurdles from top to bottom. Thus the gas is thoroughly broken up and brought in contact with the wash oil, which absorbs all the benzol vapors from the gas, the usual practice being to keep the amount of benzol absorbed between 2½ and 3 per cent of the wash oil.

The gas, then freed from all by-products, flows to the gas holder. As less than 35 per cent is required for heating the ovens, the remaining 65 per cent is available as surplus gas. This is delivered at 5 lb. pressure to a system of mains supplying gas to the mills, by a Roots positive type rotary gas booster located in the by-product room, having a capacity of 6200 cu. ft. per min. under inlet conditions of 80 deg. Fahr. The booster is driven by a non-releasing Corliss valve engine, duplicate of the engines driving the exhausters. One exhauster is also connected with the mill line, to serve as a spare for the booster.

Treatment of Wash Oil

The wash oil, enriched with the benzol and its homologues, is pumped to the wash oil still at the benzol plant, first passing through the vapor-to-oil heat exchanger, where it is heated by benzol vapors and steam from the wash oil still, then to the oil-to-oil heat exchanger, receiving heat from the hot debenzolized wash oil leaving the still. After being further heated to the required temperature of about 300 deg. Fahr. in two final heaters it enters the wash oil still, 7 ft. in diameter, containing 27 trays, in which the heated oil flows down through the still while steam admitted at the bottom travels upward, distilling out the benzol vapors. These benzol and water vapors are partially condensed in the upper part of the still and then further condensed in the vapor-to-oil heat exchanger by indirect contact with the incoming cold enriched wash oil. The final condensation and cooling are accomplished in a water-cooled condenser or light oil cooler, 3 ft. 6 in. in diameter x 24 ft. high. The benzol condensate, termed light oil, is separated from water in the condensate in the light oil separator, 3 ft. diameter x 11 ft. high, and flows to a 20,000-gal. light oil storage tank.

After leaving the oil-to-oil heat exchanger the wash oil is finally cooled by the wash oil cooler, consisting of ten banks of pipe cooled by water flowing over them, and then pumped again to the benzol washer, completing a continuous cycle of circulation. There are five wash oil circulating pumps of the positive cycloidal type, all iron-fitted, each having a capacity of 7500 gal.



In the Middle Foreground Are the Primary Coolers, Which Rest on a Reinforced Concrete Structure Forming a Room Which Houses All By-Product Department Pumps, Water Service Pumps and Air Compressors. The gas collecting main from the ovens, the pitch trap and the hot drain tank, which is located above ground level, are shown at the left, the by-product building at the right. The gas holder, tar and ammonia liquor tanks appear beyond

per hour, individually driven by 7 x 6-in. vertical engines at 350 to 450 r.p.m., one serving as a spare, located in a lean-to of the benzol building.

The heat exchangers of this system effect a great saving, both in steam necessary for distilling off the light oil and also in water required for cooling the wash oil.

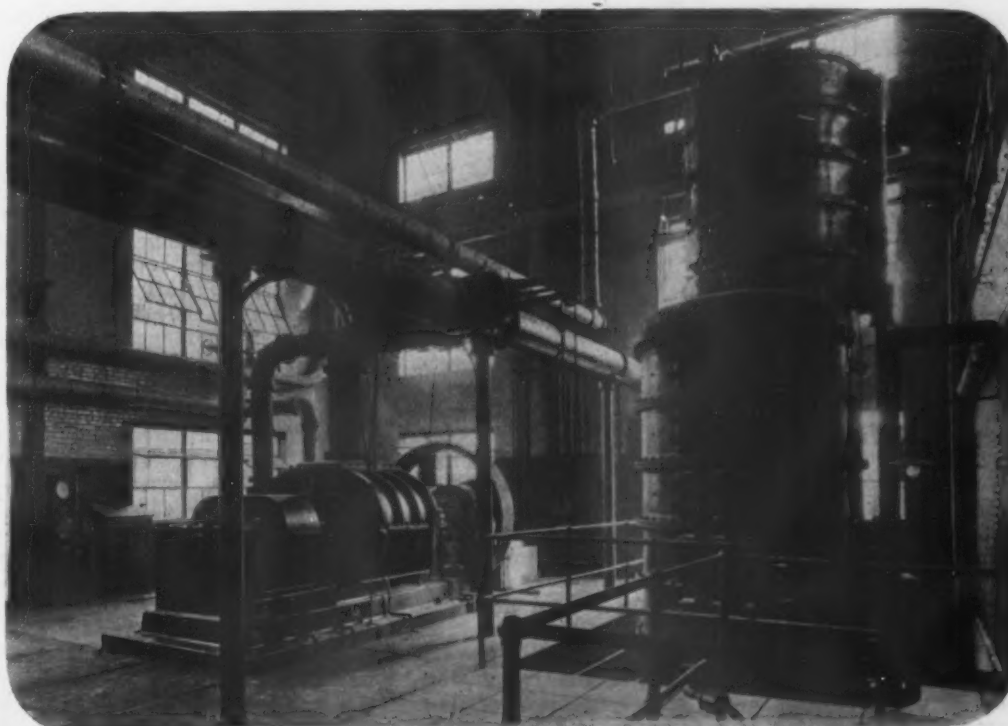
The benzol building is 31 ft. long, 51 ft. wide and 42 ft. high to the bottom chord of the roof, with a pump room lean-to 15 ft. wide by 31 ft. long, and is designed for extension for additional equipment in the future. In addition to the light oil apparatus, the building contains a crude still and a pure still, the still tanks being 9 ft. diameter by 13 ft. 9 in. long, each with a working capacity of 7000 gal.

Light oil which shows a distillation test of 93 per cent at 200 deg. C. is washed by mechanically mixing

with 66 deg. Baumé sulphuric acid in a 4500-gal. agitator to remove impurities, principally olefines and phenoloides, and then agitated with caustic soda solution to neutralize the acid. The purified light oil is then charged in the crude still and about 92 per cent of the benzol and its homologues distilled off by the application of steam in heating coils in the still tank, leaving a residue of naphthalene and wash oil. Two cooling pans, 6 ft. wide, 16 ft. 6 in. long and 2 ft. deep, receive the residue and serve to crystallize out the naphthalene, the wash oil being returned to the wash oil system. The benzol vapors from the still are condensed and cooled by tubular condensers and coolers, three fractions being made: crude benzol, crude toluol and crude solvent naphtha.

These crude products are then separately redistilled in the pure still without further treatment, and the

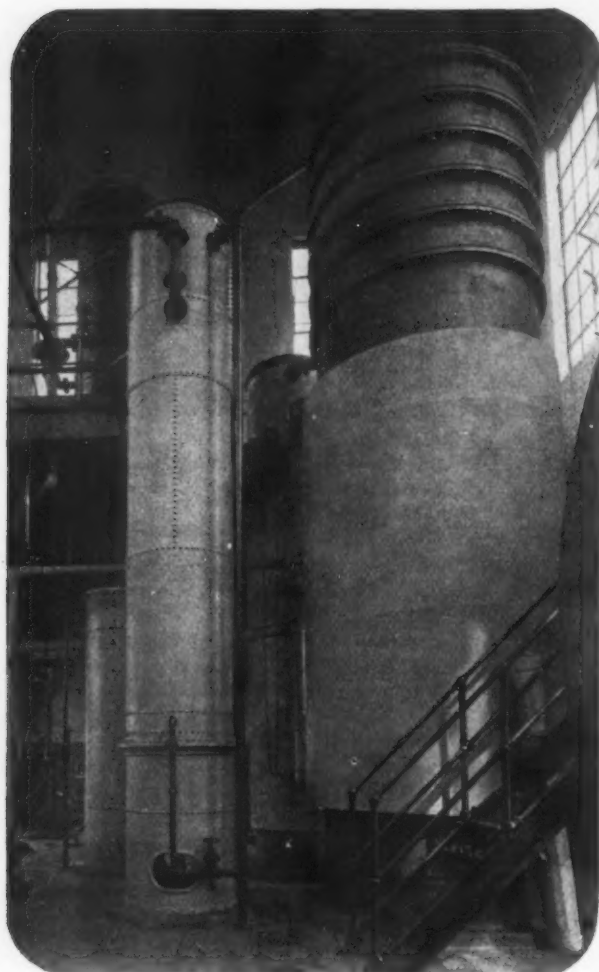
At Left in This Photograph Is the Engine-Driven Positive Type Booster Located in the By-Product Building Which Pumps the Surplus Gas to the Supply Lines Feeding the Steel Mills and Finishing Plants. The ammonia stills are shown at the right



vapors condensed and cooled, making nitration benzol, nitration toluol and nitration zylol—all of these products as finished being absolutely non-corrosive to copper and silver. A small amount of intermediates remaining in the still fulfill the specifications as 90 per cent benzol.

Water and Electric Supply

Water is pumped into the large service main from the river pump house, 88 ft. below the plant level, which parallels the South side of the plant. Two motor-driven centrifugal pumps—one being in reserve



Interior of Benzol Building, Showing the Wash Oil Still with the Final Heaters in the Rear, the Light Oil Cooler and Separator and the Vapor-to-Oil Heat Exchanger on the Platform Above. The wash oil circulating pumps are in the leanto at the rear and the charging and loading pumps at the left

—located in the by-product pump room, having a capacity of 2000 gal. per min., boost this water from 40 ft. to 125 ft. total head, for general plant purposes.

Electric current at 6600 volts, 60 cycle, is supplied from the main plant transmission system to a substation at the coke plant, and stepped down by three 333-kva. transformers, furnishing current at 550 volts for all coal and coke handling and pump motors, also for two 150-kw. direct current motor-generators, furnishing power to the oven machinery.

All main transmission lines from the substation to the points of distribution are laid in underground conduits encased in concrete, all exposed lines are laid in pipe conduits and the motors are totally inclosed to exclude all dust. The substation, of brick and concrete, is 34 ft. wide by 45 ft. long, housing the high-tension transformers, lightning arresters, 23,000-volt oil circuit breakers mounted in brick cell structures, the two motor-generator sets and the main control and distributing switchboard.

The surplus gas is used at the tin mills for all annealing, for the annealing furnaces and galvanizing pots at the sheet mill and for part of the annealing furnaces at the strip mills. A gas main also connects

with the open-hearth plant, gas being used for heating the mixer and for drying the ladles and steel runners. All open-hearth furnaces are piped for gas and tar burning, so that any surplus not required at the other plants, and at week ends when they are not operating, can be used in the open-hearth furnaces, eliminating all bleeding of gas. The total surplus gas is metered at the coke plant and also to each department using it. Regulating valves at each department maintain the pressure required at each plant. The gas as applied has replaced producer gas or coal firing and has substantially increased the efficiency and reduced costs at these departments.

The plant was built in remarkably short time. Construction work was started Nov. 1, 1922, and despite the bad weather and delays during the winter months, the plant was ready for operation July 1, 1923, in accordance with the original date set for completion—just eight months after the beginning of construction. The plant equipment was designed and constructed by the Koppers Co. in collaboration with the engineers of the Weirton Steel Co.

Results of Operation

The ovens were brought up to heat and first coke pushed July 7, 1923, and the ovens have operated continuously on 11 hr. 26 min. coking time, carbonizing 1060 tons of coal per day or 29 tons, per oven, per day, without any leaks developing in the brickwork or overheating in any portion of the battery, and establishing a new record for short coking time and production of blast furnace coke from a like number of ovens.

All coke used at the blast furnace has been from the plant. Only the coke which passes over the 1¼-in. rotary grizzly screen is classed as furnace coke and sent to the furnace, the coke passing through the screen being separated, the nut coke being sold as domestic coke on the market and the breeze used at the soaking pits or burned under boilers. The following average results of operations will give a good idea of what has been accomplished:

	December	Jan. 1 to 21
Gross coking time.....	11 hr. 46 min.	11 hr. 46 min.
Net coking time.....	11 hr. 26 min.	11 hr. 26 min.
Coal per oven per day.....	28.7 tons	
Furnace coke per day over 1¼-in. revolving grizzly...	661 tons	
Per ton of coal:		
Total coke yield.....	75.75 per cent	75.49 per cent
Furnace coke yield.....	63.07 per cent	63.24 per cent
Domestic coke yield.....	6.98 per cent	6.33 per cent
Breeze.....	5.70 per cent	5.92 per cent
Total gas yield.....	11,360 cu. ft.	11,790 cu. ft.
Tar yield.....	12.37 gal.	13.13 gal.
Sulphate yield.....	25.21 lb.	25.50 lb.
Light oil yield.....	4.03 gal.	4.10 gal.
Surplus gas.....		63 per cent

Average Analysis by Percentages

	Coal	Coke
Moisture.....	2.73	1.11
Ash.....	9.25	11.79
Sulphur.....	1.01	0.72
Volatile matter.....	33.60	0.67
Fixed carbon.....	57.17	87.85

The debenzolized gas averages 590 B.t.u.

The tar is of low specific gravity, rich in creosote and anthracene oil, high in tar acid, approaching tar produced by low-temperature coking processes, and is in demand for creosoting and wood preserving purposes.

The sulphate is of good standard grade, with large pure white crystals. The benzol plant was originally intended for the production of motor benzol. But additional tanks have been added and changes made, so that all of the product is now being made into nitration benzol, nitration toluol and zylol.

The plant has exceeded the guarantees and yields expected prior to its building. It was built to supply coke to the blast furnace to yield results equal to or better than those obtained from beehive coke from coal from the company's mines. While the blast furnace and coke plant departments have had a relatively short time in which to compare their practices, the results so far have proved that a good coke can be made from the Klondike basin coal and that blast furnace results may be expected from this coke which will eliminate the necessity for using low-volatile coal.

The following results from the blast furnace, which is lined for 600 tons, in August, on straight ore and

in December with scrap added to increase the hot metal production, will give an idea of the performances obtained with the use of this coke.

	August	December
Average day.....	610.8 tons	757.8 tons
Average on ore only....	610.8 tons	626.6 tons
Coke per ton iron.....	2,078 lb.	1,667 lb.*
Stone per ton iron.....	700 lb.	583 lb.
Ore per ton iron.....	3,880 lb.	3,015 lb.
Sinter per ton iron.....	486 lb.	369 lb.
Turnings.....	None	441 lb.
Per cent Mesaba ore used	76.0 per cent	91.5 per cent
Cu. ft. wind blown.....	43,290	43,875
Hot blast pressure.....	18 1/4 lb.	19 1/4 lb.
Hot blast temperature..	1,005 deg.	979 deg.
Top temperature.....	355 deg.	326 deg.
Average iron analysis, per cent:		
Silicon	1.34	1.20
Sulphur	0.034	0.038
Phos	0.369	0.284
Manganese	2.12	1.73
Coke used:—By-product from 100 per cent....	81.9 per cent	100 per cent
High-volatile coal....	9.6 per cent	Revere
High-volatile coal....	8.5 per cent	Stock

*2001 lb. on straight ore basis.

In October, the open-hearth plant made what is probably a world's record tonnage for a seven-furnace plant, producing 50,431 tons of ingots, using 38 per cent hot metal from the blast furnace and the balance light sheet scrap and crops from the blooming mill and finishing mills.

Gages to Be Studied Under Service Conditions

WASHINGTON, Feb. 19.—The correlation of the hardness of steel gages as ordinarily measured and the resistance to wear in actual service was discussed at a meeting of the Steel Gage Committee held Feb. 16 at the Bureau of Standards. It was attended by more than 20 steel and gage makers and gage users and was presided over by B. L. Blood, general manager Pratt & Whitney Co., chairman. The conference also took up the progress made by the committee and some plans for the future were discussed.

The consensus of opinion was that the hardness of gages as ordinarily measured has no simple relation to resistance to wear. Experiments so far carried out in the rate of wear, it was shown, have given somewhat contradictory results. Further experiments in the rate of wear will be made. The question of submitting a series of sample gages to several gage users was discussed and it was decided that steps should be taken to obtain from several automobile manufacturers detail drawings for plain plug gages regularly used in the inspection of their product. Gages will then be made to these drawings and sent out for a service test.

Major J. O. Johnson, chief of the gage section, the Ordnance Bureau, War Department, reported on the series of gages that has been in use at Frankford arsenal and declared that gages made from chrome-bearing steel showed a much lower rate of wear than similar gages made from gage steels more commonly used.

The question of membership on the committee was brought up and the point was emphasized that the committee is entirely informal and that no hard and fast membership lines have been drawn. Any one who wishes to sit with the committee, giving what he can, it was explained, is a member of the committee.

The next meeting will take place the last week in March or the first week in April in Detroit so that the committee may be in direct touch with gage users, such as automobile makers.

The Federal Trade Commission reports that the total value of goods exported under the Webb-Pomerene law during the first eight months of 1923, amounted to approximately \$60,000,000. Iron and steel and related products represented only about \$500,000, and included such items as locomotives, textile machinery, steel tires, pipe fittings, etc. The largest item consisted of food-stuffs, with a value of \$25,900,000, while the second largest item was lumber, with a value of \$13,336,000.

Sheet Steel Executives to Meet at White Sulphur Springs in May

The second annual convention of executives of independent sheet steel companies will be held as was the first one, at Greenbrier Hotel, White Sulphur Springs, W. Va., May 12 to 15, inclusive. The meeting is under the auspices of the National Association of Sheet and Tin Plate Manufacturers, and W. S. Horner, president of that body and general chairman of the convention committee, says the program will be along the lines of that of a year ago. Discussions will be under the general headings of "Administration," "Production," and "Distribution," with the possibility that the question of sales promotion in connection with galvanized sheets will be given a place in the program.

As reported in THE IRON AGE, Feb. 14, the first step in this movement will be the establishment of standards of quality and weights and the elimination of scant coating and light weight to gage in an effort to restore galvanized sheets to their former place as serviceable material for roofing and other purposes, a position partly lost in recent years because of poor quality by comparison with substitute materials. It is doubtful, according to Mr. Horner, whether much sales promotion effort will be made until after the standards have been established and adopted and the manufacturers have something to advertise. Business sessions will be held each morning of the convention days, with the afternoons to be given over to golf and other recreation.

Motor That Corrects Power Factor

As was to be expected from the presentation of a paper on a 60-cycle motor before the Association of Iron and Steel Electrical Engineers, Pittsburgh, Feb. 16, a society whose membership runs heavily to steel industry engineers and still clings largely to the 25-cycle motor, discussion was strong about that phase. It was quite evident that while the steel mill engineers regarded the new motor as a step forward in the correction of the power factor as far as the central station was concerned, it had not yet reached the point where it was available for the steel industry, to say nothing of the inability of the Fynn Weichsel motor to reverse.

It was admitted by W. A. Layman, president Wagner Electric Corporation, St. Louis, builder of the motor, that it had its inception in demands from the National Electric Light Association, and was designed to solve the power factor situation of the central station in which 60-cycle motors of small size predominate, but both he and Mr. Weichsel urged that the present motor was only a start. The latter, while admitting that the motor was more complicated than the squirrel cage motor, asserted that the windings were the same as in other motors, that it could be built to 25 cycles and also to any capacity. It was not his thought that his motor would do away with other types, but rather would supplement them, just as the telephone did telegraphy.

Mr. Layman emphasizes that the motor was not exclusively a leading power factor machine, but that it was primarily built to operate at a unity power factor. Reversing is possible in the motor through a shift in the angle of the brushes, which Mr. Weichsel stated, in response to a query, was a shift of 30 to 40 mechanical degrees.

W. E. Cowles, Corliss Carbon Co., saw in the motor a drift back to direct current and a fresh lease of life to the brush makers.

Mr. Needham, Westinghouse Electric & Mfg. Co., expressed the thought that since the induction motor is inherently one of constant speed, the attempt in the Weichsel motor to introduce variable speeds would make necessary the introduction of commutators.

There were several demonstrations of the motor for out-of-town members of the association on the afternoon of Feb. 16, at the laboratories of the Duquesne Light Co., Pittsburgh, under the direction of George W. Quenton and Orville Buys of that company.

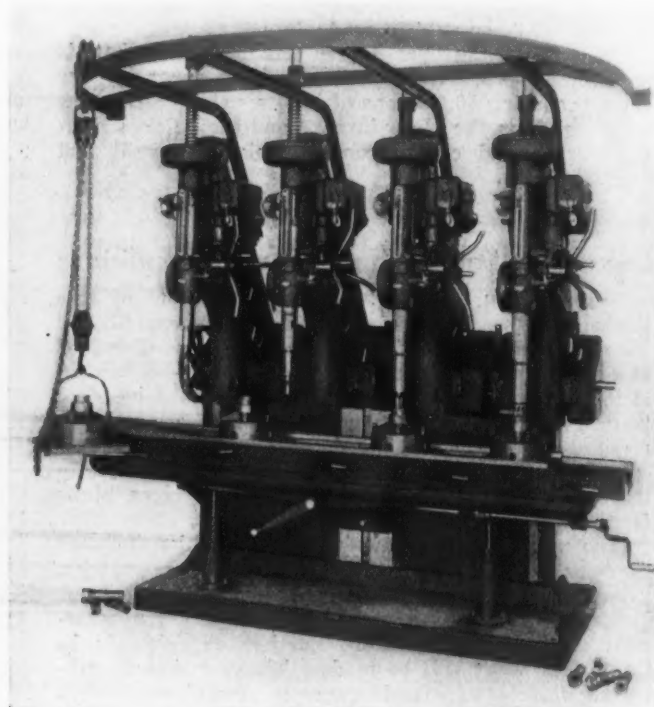
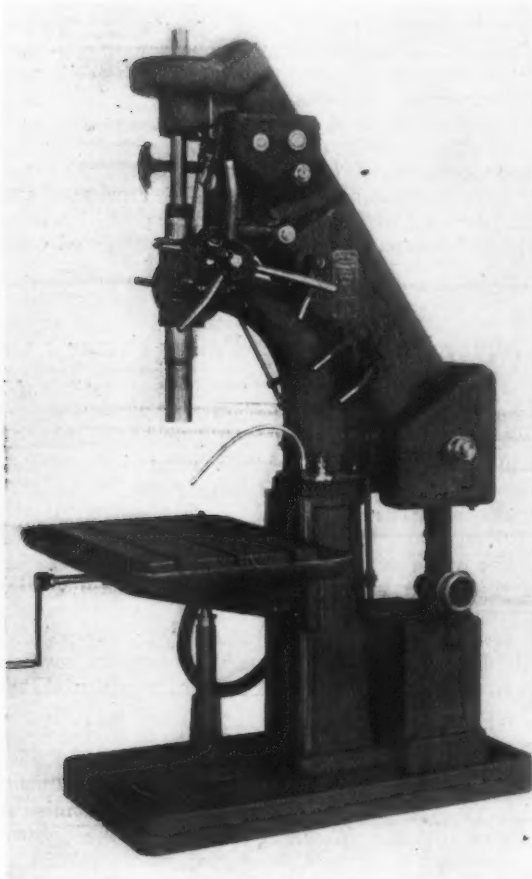
Additional Features Provided for Barnes Co. Drills

The self-oiled all-g geared drilling machines of the Barnes Drill Co., Rockford, Ill., are now available, equipped with a square column and a rectangular table mounted on the column ways and supported by a raising screw, as shown in the accompanying illustration, the new features being intended to provide additional strength and rigidity. The finished surface of the table is 18 by 28 in. The base may be furnished with finished surface and T-slots.

All gears are entirely inclosed and their bearings including crown gears, feed box gears and worm and worm gear are constantly oiled by a pump provided. The machine illustrated has eight changes of geared

Threshing Machine Company Will Lease or Build Plant in the East

The C. V. Hirsch Threshing Machine Co., 2509 East Twenty-eighth Street, Kansas City, Mo., has been organized with \$100,000 capital stock to manufacture tractors ranging from 20 to 70 hp., with either crawler or round-wheel traction. The tractor is so designed as to allow shifting quickly from one means of propulsion to the other without the use of extra tools. The company will also manufacture various types of threshing machines. Present plans contemplate leasing a factory, but it is possible that the construction of a new plant will be undertaken. Mr. Hirsch is looking toward Wilmington, Del., or some point in eastern Pennsylvania for a location. Quantity production is figured,



Square Column and Rectangular Table Mounted on Column Ways, and Supported by Screw Is Feature of Drill at Left. The trolley for handling figs is shown above

speeds and eight changes of geared feeds. The drill is furnished with back gears, geared feeds and automatic stop complete, or with automatic stop only. Four speeds are obtainable without back gears. For tapping, reserving multiple disk clutch gears and automatic reverse may be provided.

Another improvement offered is in connection with the company's multiple spindle machines, which may be equipped with the overhead trolley arrangement, shown in the accompanying illustration of the four-spindle 24-in. gang drill. This is for returning the work holders, which weigh 75 lb., to the loading position. In addition to lightening the operator's task, it is claimed that with four spindles doing the machine work simultaneously, one drill-press operator is able to produce more than a lathe hand with a chucking lathe.

The four spindle drill illustrated is specially equipped for machining cast iron bushings $7\frac{1}{4}$ in. long with $1\frac{1}{4}$ and $1\frac{1}{2}$ in. tapered bore having two steps of larger diameters at top end. A production of one finished bushing—drilled, bored and faced, rough-reamed, every 40 seconds, one operator in charge—is claimed.

hence the preferred location is one that will offer an opportunity for later expansion.

Some of the manufacturing will be done under contract, including forging, steel casting and a few special parts. Among the requirements for production are several engine lathes, two or three rapid production lathes, gear shapers, milling machines, planers, crank shapers, radial drills and general machine shop equipment. A complete line of sheet steel forming machines, also complete equipment for electric welding will be installed. The officers of the company are C. V. Hirsch, president; C. S. Jennings, vice-president, and F. B. Hirsch, secretary-treasurer. The principals have had several years of experience in the manufacture of threshing machinery and farm implements.

Mr. Hirsch is planning to come East soon to decide upon a manufacturing location and to make preparations for production.

Roller bearings is announced as the subject of a meeting of the American Society of Mechanical Engineers in Newark on March 11. S. H. Libby, General Electric Co., Bloomfield, N. J., is secretary of the section of the society in charge.

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THE IRON AGE

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The Coming Tax Reduction

WE are now able to see fairly well what sort of a tax reduction bill will emerge from the House of Representatives. It will be the Mellon bill amended to 37½ per cent or possibly 44 per cent maximum surtax, to a maximum limit of \$20,000 for the favorable consideration of earned incomes, while to incomes of less than \$5,000 the same favorable consideration is given to those currently earned as to those derived from investments, having been previously earned by somebody. In short, Congress will bring about tax reduction because the people want it so; but it knows little more about the science of taxation than does the mass of the people and is as unwilling to pay attention to the advice of experts.

Secretary Mellon drafted a bill that is no more partisan than the prescription of a doctor of medicine or the recommendations of a consulting engineer to the stockholders of a company. He had two purposes in view, which were (1) reduction of what the Government was unnecessarily taking out of the taxpayers, and (2) reduction of surtaxes because they were ceasing to produce revenue. There was no suggestion in this of using the taxing power to effect social readjustments. The nearest approach Secretary Mellon made to such ideas was his statement that in not going so far in reducing surtaxes as his experts advised, his action was purely from the standpoint of the tax-gatherer. To this it might be added that orthodox economic thinking suggests even greater reduction of surtaxes than the tax experts recommended and less reduction of consumption taxes.

In fact, Secretary Mellon did not recede one iota from the principle of progressional taxation, but said simply that it was unwise to prescribe burdens for the rich which they could and would avoid. The records of the Treasury Department showed clearly this effect of high surtaxes. We may add confirmatory evidence from the studies of economic science. In past years estimates of the national income have been based on (1) goods produced and services performed and (2) incomes received as reported by the Bureau of Internal Revenue. Up to 1919 the estimates by the two methods checked pretty well. Since that time the estimates by the second method have been falling increasingly short and the method itself

has been pronounced unreliable, by reason of the breakdown of the taxing system, and therefore has been discarded.

One method of tax avoidance is the transfer of investment to tax-exempt securities. The first happy idea of the thoughtless is to abolish all exemptions, but it was shown promptly that that would be unconstitutional. Another method of avoidance is the organization of corporations for personal affairs. Well, then, let us surtax the corporations, it is suggested. But, nay, the corporations of the country are largely owned, directly and indirectly, by persons of small income, and surtaxing the corporations would be surtaxing such persons, and very irregularly, at that.

Failing with such ideas, the majority of the House of Representatives says, or is about to say, that it will write a bill declaring that the rich ought to surrender very large parts of their income to the Government, although we know that they will do no such thing and that economic evils are bound to be continued. The disregard of the scientists in this matter is simply a new exhibition of the folly of learning economics by autopsy instead of by diagnosis and prognosis.

Freights and Farm Products

GENERAL reference was made in THE IRON AGE last week, under the caption "Commodity Price Relations," to the fact that price relations between groups of commodities have greatly changed, so that an increase in the purchasing power of the dollar in general would not return all groups of commodities to any pre-war price level and a return of the average "would be hardly more than an arithmetical accident."

The general practice of late of making price comparisons by using 1913 prices as 100, or the basis of the relative, has given that year an unjustified prominence. People are not entirely satisfied with price relations now existing, but in 1913 they were not satisfied with the relations then existing. For several years there had been the cry "Back to the farm." Farm products were considered too high priced. The late James J. Hill had written much on the subject. He took trends and computed the year in which we should have to begin importing wheat.

The Bureau of Labor's index number of com-

modity prices at wholesale was at first computed by taking the average of the ten years, 1890 to 1899 inclusive, as the basis, or 100, for the relatives. Now the bureau uses 1913 as the basis, whereupon the group "farm products" has appeared to be too cheap. For the year 1913, however, the relatives based on 1890-1899 were 165.8 for farm products and 135.2 for all commodities. For December, 1923, with 1913 as the basis, farm products stood at 145 and commodities in general at 151. By a chain method, multiplying the relatives together, we get 240 for farm products and 204 for commodities in general, as the relatives for December, 1923, based on average prices 1890 to 1899 inclusive.

Farm products are thus 18 per cent above the general average, based on the average of price relations in 1890 to 1899. It is readily remembered that the farmers were dissatisfied at that time. They are dissatisfied now. The difficulty is to recall a time when they were satisfied.

The Bureau of Railway Economics has just issued the first two of a series of bulletins on commodity prices in their relation to transportation costs. The first bulletin deals with grains. The principal object is to show that market fluctuations, with freight rates stationary, are large, and in the period taken, Aug. 17 to Dec. 28 of last year, in many cases exceeded the entire freight paid from points of production to the wholesale markets. In wheat from a large number of points to Minneapolis, the price fluctuation, in a trifle more than four months, averaged substantially as much as the freight. To Chicago the fluctuations in general exceeded the freight. To the St. Louis market the fluctuations were several times the freight. In corn and oats the market fluctuation in most cases was several times the freight rate, to Minneapolis, Chicago and Omaha.

Of course the farmer cannot be convinced by statistics. He wants to hold what he had in 1913 and, if possible, get more, just as organized labor wants to hold what it had in 1918 and, if possible, get more. The question is whether we desire to let economic laws work or prefer to attempt the application of artificial remedies, such as squeezing the railroads in hope that the farmers may get some result therefrom.

Manganese and the Tariff

THE manganese ore tariff clause in the bill which went into effect Sept. 22, 1922, has thus far failed of accomplishing the end sought. A duty on the foreign ore was intended to stimulate the production of high-grade domestic ore. Late last year, when attention was called by this and other journals to the sharp falling off in imports of manganese ore and to the striking discrepancy between the apparent ore supplies, as measured by imports, and the heavy output of ferromanganese, champions of the duty referred to and advocates of the protection of an American industry at once claimed that the imagined discrepancy was being canceled by shipments of ore from American mines.

Last week a preliminary report from the U. S. Geological Survey announced that in 1923 Ameri-

can mines produced only 32,000 gross tons of high-grade ore. This is insufficient to keep one American blast furnace operating six months on ferromanganese. The insignificance of the domestic ore output last year is emphasized further when it is realized that for the domestic production of the 240,000 tons of ferromanganese made in 1923, at least 600,000 tons of ore was necessary.

The history of the manganese industry last year throws an interesting light on the tariff situation. So far as the effect of the manganese duty has thus far gone, it has not been a stimulant to greater mining in this country, but has rather increased the cost of steel to the ultimate consumer. It cannot be denied that the duty in general has been a protection to the domestic maker of the ferroalloy. It has not, however, been to the advantage of the greatest number of persons concerned.

More Respecting Trade Associations

THERE is a movement toward securing such changes in the anti-trust laws as will legalize the gathering and distributing of trade statistics with the approval of certain of the departments and commissions in Washington. We think that this is something to be severely deprecated, for several reasons. The Sherman law does not really need modification for this purpose, as we have previously pointed out. If the subject is introduced into Congress that body will be sure to bedevil it. Even putting the economic and statistical work of the industries under bureaucratic supervision would be deplorable and dangerous.

The excitement over this whole affair was unnecessary; and has been the consequence of selfishness, malevolence and stupidity in Washington. The staff of the Department of Justice set out to make a name for itself by a species of muck-raking. Everyone knows that its record in the courts has been one of spectacular failure, rather than of success. At the same time it let the matter of the oil leases pass without attention.

It is the public recognition of this which is inspiring the demand for the retirement of the Attorney-General. Probably his young men, rather than himself, are responsible for the departmental derelictions, but naturally the onus of them falls upon the chief. The proper function of the Department of Justice is to live up to its name, not to afford a means for self-seekers to exploit themselves.

The matter of the trade associations was a departmental adventure of that order. Some of the staff thought to ride to fame by extinguishing statistical work. They found a peg on which to hang their hopes in malfeasance by a relatively few industrial organizations. They aimed to bring about the extinction of the good ones through fear, wherefore the crypticism of their communications. The honest associations refused to be frightened, however, just because they were honest and courageous and had good legal advice.

The animus of the Department of Justice was disclosed moreover by its refusal to bring a clear-cut statistical test case. It would not do so probably for the reason that it felt in its bones that

it would lose, just as it had lost other spectacular cases. It knew that in this anti-statistical campaign it was going much further than its own accomplished solicitor-general had gone in the really equivocal cases that had been tried in the courts.

We think that the last has been heard respecting doubt or danger as to the position of the industrial associations, and that the subject will disappear from public discussions. The sooner it be forgotten the better will it be. About the worst thing that could happen would be to keep it stirred up and to invite Congress to take a hand in it.

No American Labor Party

AN article in the *American Federationist* by Charles Edward Russell purports to explain why the labor unions of the United States do not want to have a Labor Party. The article says: "A certain part of the American press, rejoicing in the increased strength shown in the recent elections by the British Labor Party, inquires with emphasis, 'When are we to have a Labor Party in the United States?' The question is easily answered. We shall never have a Labor Party in the United States."

The main part of the argument is that conditions are different. They have a caste system in Great Britain, while we do not. In a caste country labor has "terrible and crushing disadvantages" and must turn to political action for relief. Mr. Russell admits that in the United States labor has "no such burdens." It will be generally granted that he is right there. Much of the remainder of the article is occupied with the argument, not precisely to the point, that high wages and prosperity have been contemporaneous, hence the first is the cause of the second.

The Iron Age and Its Readers

SPONTANEOUS expressions have come from a number of IRON AGE readers in appreciation of the editorial in our issue of Jan. 31, "What Is the Value of Our Railroads?" The president of an important Western line, writing from Chicago, says: "You have done a tremendously big thing in this article. I consider this editorial one of the most powerful I have ever seen." Another railroad president whose war-time service was conspicuous writes that our estimate is not too high, though in his presentations for the information of the public he confined the figures to a lower level than the 37¼ billions of dollars, by not giving full credit to railroad property values in the great cities.

The president of one of our great trans-continental lines writes that "A contribution of this kind at the present time and from such a source is of very great importance." Still another Western railroad head describes the editorial as telling the story splendidly.

Another reader, long connected with the tool steel industry, who has studied deeply the country's problem of railroad regulation, says that "THE IRON AGE has done a job of inestimable importance to business—and common sense."

The chief reasons why we have not had, and are unlikely to have, a Labor Party in the United States are conspicuous by their absence from the article. One reason is that the so-called "labor vote" can be used in an effort to frighten whatever party may be in power. The bluff is more useful than would be such power as could be secured by electing labor members to Congress, for the test has been that labor leaders cannot get the votes of their alleged followers.

Whether it be on account of caste in Great Britain and no caste in the United States, it would be getting closer to the substantial fact to say that in the United States the members of labor unions constitute only about 10 per cent of those who are gainfully occupied. If there are many others who under British conditions would be members of a Labor Party why do they not at least go as far as to join the unions? If the labor unions of the United States should undertake to form a Labor Party, and should even succeed in getting all their members into the party, the operation would merely serve to crystallize and emphasize the antagonistic feeling of the other 90 per cent of those who work. This the labor union leaders undoubtedly realize quite well, although the point is not brought out in the *Federationist* article.

When we count up labor unionism in the United States what do we find? Segregate railroad workers, coal miners and building trades artisans, and there is left neither skin, flesh nor skeleton to form a body. A Labor Party would at once become generally regarded as being railroad workers, coal miners and building trades artisans. How does the public look upon these classes of workmen? Knowledge is general that railroad jobs have been multiplied, whereby there is less service rendered per man than there should be. Everyone has heard that there are too many coal miners, that they do not work enough days in the week. It is equally well recognized that the cost of building, which affects everyone, is unreasonably high on account of union restrictions.

The economics is being preached, and is daily receiving wider recognition, that for prosperity we require production. For the general good we do not need, and could not secure, a "living wage" artificially produced, but we do need more goods and service so that they can be bought. A Labor Party would mean publicity, and publicity has not been improving the standing of the labor unions in the minds of the other 90 per cent of those who work.

Industrial Papers at the World Power Conference

The industrial phases of power utilization will be represented by three papers at the World Power Conference to be held June 30 to July 12 in connection with the British Empire Exposition in London, England. One of the papers will be on steel mill operation by B. H. Shover, consulting engineer. A general review of electrochemical progress and processes in the United States will be given by F. A. J. FitzGerald, FitzGerald Laboratories. Electric power in metallurgy will be discussed by an author to be announced later.

Prospectus for this conference was published in THE IRON AGE, Aug. 16, 1923, page 408, and Dec. 6, page 1514.

BILLINGS & SPENCER REPORT

Prospects Brighter Than Since 1920—Duralumin Forgings and New Drop Hammer to Be Marketed

Although the results of 1923 business show a loss, F. C. Billings, president Billings & Spencer Co., Hartford, in his report at the stockholders' meeting held Feb. 18, stated that the loss is much less than that shown in the years immediately preceding 1923, and declared that the prospects at the present time are brighter than they have been since 1920.

The stockholders reelected the board of directors by a unanimous vote. At a directors' meeting held Feb. 21 Arthur W. Fox, vice-president and general manager of the Johns-Pratt Co., Hartford, was elected vice-president and general manager of the Billings & Spencer Co., to take office March 1. F. C. Billings, president; J. B. Sehl, vice-president and treasurer; E. H. Stocker, secretary, and F. H. Stocker, assistant secretary, continue as officers of the company.

It was brought out in the president's report that during the last half of 1923 operating expenses were substantially reduced, and had the company been able to operate throughout 1923 under the same conditions as prevailed in the last six months of that year, a profit would have been shown for the year, instead of a loss.

Few in the Industry Show Profit

To contract forging, one of the most important parts of the company's business, was ascribed the inability to make a better showing even on the basis of the retrenchments made. "The forging industry," said Mr. Billings, "has been sick since the conclusion of the war, owing to the fact that the demands for war material necessitated the increase of forging facilities throughout the industry to the extent of at least 50 per cent. Since the war there has not been enough business to keep 25 per cent of the existing equipment in operation.

"This fact itself has created an intense competition and it is a conservative statement that there do not exist any more than four or five firms that have been able to show a profit at any time since the end of the war. Of these, one or two are specialists and the others have been sources of supply for such concerns as the Ford and Dodge companies, from whom they receive a

volume of business that insured maximum production.

"The prospects at the present time are brighter than they have been since 1920. Our forging department is now operating at 75 per cent of its capacity and we have orders on our books that will insure a constantly increasing activity for the next six months. The volume of business received in the month of January is very nearly what we would expect for a normal business, and we expect to bring our production up to equal the rate of orders received by May. We have every reason to expect a substantial increase of business in each of the different lines we manufacture."

It was stated that at present a larger percentage of the company's forging business than formerly is with the automotive trade. In what is termed the merchandise or catalog line several changes made were said to be showing beneficial results in increased sales, these changes applying particularly to the Middle West, Pacific Coast and the Southern territory. The company's field men in the Texas and California oil fields report that greatly increased activity may be expected this spring. Substantial orders for tools for that industry are expected.

The manufacture of forgings of Duralumin was reported to have been taken up and a large demand expected from automobile manufacturers. It is used as connecting rods and for other automobile parts and one company alone is said to expect to use 2000 Duralumin connecting rods per day.

Expect Good Demand for New Drop Hammer

The company's machinery business was said to have been making a satisfactory showing in the past year. A good demand is expected for a new drop hammer recently developed when it is ready for the market. "These machines," said Mr. Billings, "will sell for \$15,000 to \$25,000 each, and will show a good profit. Several patents on improvements have been applied for, and we expect to control the market for this particular type of hammer."

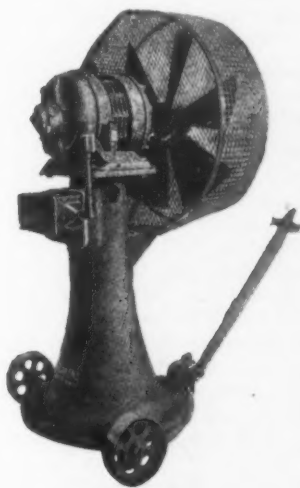
The company's balance sheet as of Dec. 31 shows fixed assets of \$1,459,156.25, current assets of \$1,781,398.80, and securities sufficient to bring the total to \$3,360,695.98. Current liabilities are \$752,294.22 and reserve for inventory depreciation \$88,217.87. Bonds outstanding are \$566,000. The company's capital is, preferred, \$750,000; common, \$1,000,000. Its surplus is \$204,183.89.

Fan for Cooling Operators Working Under High-Temperature Conditions

A specially designed motor fan, known as the Man Cooler and intended for use in metal working and other

industries where men work under conditions of high temperature, is being offered by B. F. Perkins & Son, Inc., Holyoke, Mass.

The general construction of the fan may be noted from the accompanying illustration. It is made up of a high-capacity fan wheel, mounted on the shaft of an electric motor, and secured to a heavy pedestal, the wheel being protected by a heavy mesh guard, as shown. The speed of the fan wheel, which is of disk type and of special design, is double that considered normal for the usual fan. The blades are electrically



Sturdy Construction Is a Feature

welded to forged steel arms, which are threaded, screwed into the hub and locked with a set screw. A set screw in

the hub grips the arm above where it is threaded, holding the blade at any desired angle. The fan may be equipped with a truck, which is an integral part of the base and permits easy moving from one part of the plant to another.

The device is claimed to produce a rapidly moving stream of air that can be directed to any desired spot. It may be placed in position to blow directly on the man as he works or between the man and the source of heat to which he is exposed. Force of blast may be adjusted according to the intensity of the heat and the nearness of the worker to its source. It is claimed that because the air of the same temperature as that in which the men are working, there is no harmful chilling effect, such as would be produced by cold air let in from out of doors. It is said to be the speeding up of the evaporation of perspiration through rapid and continuous circulation of air that has the desired cooling effect. A feature emphasized is that the blast from the fan covers the whole body instead of affecting only part of it.

In front of puddling furnaces in wrought iron plants and in merchant bar mills, the device is said to be used to advantage. In tube mills, the fan may be employed where skelp has been bent into pipe shape and is being reheated for the lap welding rolls, the fan being set up at the charging end to blow at the door of the furnace. Another fan may be placed in the corresponding position at the discharging end and a third one to cover the welding rolls. In the operations of steel foundries, forge works and wire mills this equipment is also said to be of beneficial service.

STRUCTURAL STEEL SALES

Figures Revised for 1923—Capacity Now Put at 260,000 Tons Monthly

WASHINGTON, Feb. 19.—The Department of Commerce announces sales of fabricated structural steel for January, based on figures received from the principal fabricators, as 72 per cent of capacity, with total sales of 161,416 tons reported by firms with a capacity of 223,977 tons per month. Shipments of firms reporting this item represented 63 per cent of capacity as against 66 per cent in December.

The table below lists the statistics reported by 179 identical firms (of which seven are now out of business), with a present capacity of 233,905 tons per month, comparing with 237,607 tons in 1923 and 231,525 in 1922. For comparative purposes, the percentage figures are prorated to obtain an estimated total for the United States, based on a capacity of 250,000 tons per month for 1922 and 260,000 tons per month in 1923 and 1924.

Bookings of Structural Steel Work

	Actual Tonnage	Per Cent of Capacity	Computed Tonnage
1922			
April	201,434	87	217,500
May	185,457	80	200,000
June	169,517	73	182,500
July	158,444	68	170,000
August	157,067	68	170,000
September	147,204	64	160,000
October	133,395	58	145,000
November	112,685	49	122,500
December	139,097	60	150,000
1923			
January	173,668	73	189,800
February	185,283	78	202,800
March	220,832	93	241,800
April	186,779	79	205,400
May	132,441	56	145,600
June	118,708	50	130,000
July	118,032	50	130,000
August	135,530	57	148,200
September	122,083	52	135,200
October	112,792	48	124,800
November	125,761	54	140,400
December	187,429	80	208,000
1924			
January	161,416	72	187,200

¹ Reported by 174 firms with a capacity of 235,007 tons; shipments were 79 per cent of capacity.

² Reported by 168 firms with a capacity of 233,882 tons; shipments were 69 per cent of capacity.

³ Reported by 163 firms with a capacity of 232,757 tons; shipments were 66 per cent of capacity.

⁴ Reported by 149 firms with a capacity of 223,977 tons; shipments were 63 per cent of capacity.

Agreement as to Sizes of Bolts and Nuts

WASHINGTON, Feb. 26.—After adopting recommendations calling for the elimination of more than 40 per cent of the types of plow bolts, representatives of the manufacturers of bolts and nuts and of agricultural implements, the Chamber of Commerce of the United States and the American Engineering Standards sectional committee embracing 26 other industrial groups last Wednesday came to an agreement on what should constitute standard sizes of carriage bolts and nuts used in the agricultural implement trade. The conference also voted to recommend to all manufacturers, distributors and consumers that the program become effective on new production on Jan. 1, 1925, and on existing stocks on Jan. 1, 1926. The meeting was held in the Department of Commerce under the auspices of the Division of Simplified Practice, William A. Durgin of the division presiding. A. E. Norton, chairman of the sectional committee, outlining the value of the conference from a technical standpoint, stated that the steps taken would affect certain exports. He estimated that the standardization plans of the conference in conjunction with other groups would eventually bring about the elimination of more than 50 per cent of the present number of open-end wrench sizes. A complete statement of the program adopted is being prepared for publication by the Division of Simplified Practice.

"No longer will it be a case of the farmer taking an armful of wrenches out to make repairs—and then not finding the right size," said A. C. Lindgren, of the International Harvester Co., discussing the proposals. "The proposed action will help the farmer in the pur-

chase of tools. When he buys a $\frac{3}{4}$ ths wrench, it will fit a $\frac{1}{2}$ nut—which it frequently would not do in the past."

The sub-committee of the conference, to which was referred the problem of technical standards for carriage bolts and nuts included A. E. Norton of the American Society of Mechanical Engineers; W. J. Outcalt of the General Motors Corporation, Detroit; H. W. Bearce, secretary of the National Screw Thread Commission; Ellwood Burdsall, Port Chester, N. Y.; William M. Horton, Cleveland; J. H. Edmonds, Bethlehem, Pa.; Commander J. B. Rhodes and Commander John N. Ferguson of the U. S. Navy; Theodore Brown, Moline, Ill.; A. C. Lindgren and O. B. Zimmerman, International Harvester Co., Chicago; Charles T. Ray of Louisville, Ky.; B. J. Kough of Moline, Ill.; C. B. LePage of the American Society of Mechanical Engineers, New York; A. J. Schwartz of the Naval Gun Factory, Washington; F. J. Schlink, assistant secretary of the American Engineering Standards Committee, New York; Robert S. Burnett of the Society of Automotive Engineers, New York; H. G. Sameit, secretary of the National Association of Farm Equipment Manufacturers, Chicago; H. J. Hirscheimer, president of the National Association of Farm Implement Manufacturers, La Crosse, Wis.

Twenty-fifth Annual Convention Will Be Held in Milwaukee Next October

The American Foundrymen's Association will hold its twenty-eighth annual convention and exhibition at the Auditorium, Milwaukee, Wis., Oct. 11 to 16, inclusive. The exhibition will be opened on Saturday, Oct. 11, and following a Sunday recess, the convention proper will start on Monday, Oct. 13. In selecting the convention city, the board of directors gave consideration to the demand for a location that would be convenient for foundrymen living in the Middle and Far West. This will be the first convention of the association held west of Ohio since 1918, and the second since 1914.

Milwaukee is the sixth city of the United States in point of number of foundries, and ranks with the first in the extent and character of its foundry activities. It is convenient of access due to the fact that it is only a two-hour ride from Chicago, which is the terminal of practically all trunk lines of the country, with hourly service to Milwaukee over two steam railroads and one electric interurban line. As in 1918, Milwaukee's auditorium will be the center of activities. This building has accommodations for exhibits, general and sectional meetings, all under one roof. The Milwaukee hotels have promised their co-operation and guarantee 2000 rooms for members and guests. It is proposed to hold a four-day meeting, Monday to Thursday inclusive, with the exhibits opening on the preceding Saturday, as at Cleveland last year, making Saturday "Milwaukee Day."

Steel Merger Hearing Continued

Philip Patriarche of the firm of Patriarche & Bell, steel jobbers, New York, testifying in the Federal Trade Commission hearing of the Midvale-Bethlehem steel merger, said that the absorption by the Bethlehem Steel Corporation of the Midvale-Cambria companies had eliminated a good source of supply for his firm. He stated that his house had been known in the New York territory as a "Cambria distributor," although it at times bought from the Bethlehem, Carnegie and Jones & Laughlin mills. He also said that following the merger the Bethlehem Steel Corporation had put into effect a new extra on square and round spring steel which had not hitherto been in effect.

Other witnesses were Thomas Willet, purchasing agent of the Rail Joint Co., Philadelphia; Harold Drake of the Kilborn & Bishop Co., New Haven, Conn., and Isaac S. Vought of Vought & Williams, New York steel jobbers. The hearing was continued on Monday with John B. Carse of Ogden & Wallace, New York steel jobbers, as the first witness.

Iron and Steel Markets in Europe

Continental Competition Hurting England Badly—Germany, France and Belgium Underbid on Rails—France and Belgium Report Improvement

(By Cable)

LONDON, ENGLAND, Feb. 26.

PIG iron is weak on the absence of substantial demand from domestic and export markets. There is some small inquiry, but consumers are reluctant to commit themselves and makers' stocks are accumulating.

Hematite is dull, owing to slackness in the steel demand, and it is probable that the output shortly will be curtailed. Foreign ore is quiet. Sellers of Bilbao Rubio ask 24s. (\$5.16) c.i.f. Tees.

Finished steel makers are perturbed by the Continent's securing various substantial Colonial contracts, including one from South Africa, which has bought German 80-lb. rails at £6-18½s. (\$29.78); French 60-lb. rails at £6 7½s. (\$27.41); Belgian 45-lb. rails at £6 12s. (\$28.39); all f.o.b.; against the lowest British price of £8 12½s. (\$37.09) f.o.b.

German ship plates to Lloyds' test have been offered at £8 (1.53c. per lb.) f.o.b.

Continental position is difficult to judge. Little business is coming here but the works are reported to be well sold for three to four months ahead. France has quoted on ½-in. sheets at £7 15s. (1.49c. per lb.) f.o.b. for three months delivery.

Reductions of the Reparations duty from 26 to 5 per cent on German imports from Great Britain has caused some surprise.

In Belgium it is understood that the Société Anonyme d'Ougrée Marihay at Ougrée, the Société Anonyme John Cockerill, near Liège, and the Société Anonyme des Hauts-Fourneaux, Forges et Acieries de Thy-le-Chateau et Marcinelle are preparing to blow in one fresh furnace each.

Tin plate is firm. Few makers are willing to accept below 24½s. (\$5.27) basis IC, f.o.b. Export demand is improving, moderate sales having been made on ac-

count of France, Italy, Scandinavia and Australia. Fresh inquiry from the Far East is stagnant.

Galvanized sheets are dull and unchanged. The big Argentine inquiry expected has not yet developed. The Indian market is lifeless. China and the Straits Settlements have bought a few small parcels in thin gages.

The Far East is buying odd parcels of black sheets of galvanizing quality. Thin specification rollers are busy on current orders but there is no new demand yet.

FRENCH IRON AND STEEL MARKET

Plants Busy, with Orders Well Ahead—Machine Building at a Standstill—Prices Higher

PARIS, FRANCE, Feb. 8.—The French market shows an improving tendency, due to the important volume of orders booked for export, for Germany particularly, and as prices have followed a similar movement, the result has been a fair amount of trade passing and the lengthening of delivery delays up to two months. Some reserve is, however, shown on the part of producers and consumers, due to the impending application of the new taxes and increased transport costs on one hand, and the decrease of coke on the other.

The last Bourse in Brussels displayed firmness, with active dealings and sustained prices. Lorraine for the moment is out of the Antwerp market, having order books well filled and keeping prices steady. Luxembourg also is out of competition, impeded in shipments by a shortage of cars; while the Germans appear irregularly and quote at parity with the Belgians.

Coke.—During January the SCOF has been supplied from the Ruhr with 283,076 tons of coke, or 9130 tons daily average. This is the highest figure reached since France entered the Ruhr. During the first five days of February France received through Ehrang 39,871 tons of coke and during the first two days of

British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.30 per £1, as follows:

	£1 13s.	to £1 13½s.	\$7.09 to \$7.20
Durham coke, delivered	1 4		5.16
Bilbao Rubio ore†	1 4		5.16
Cleveland No. 1 foundry	4 17½		20.96
Cleveland No. 3 foundry	4 15		20.42
Cleveland No. 4 foundry	4 14		20.21
Cleveland No. 4 forge..	4 13		20.00
Cleveland basic	4 15		20.42
East Coast mixed.....	5 1		21.71
East Coast hematite....	4 19	to 5 0	21.28 to 21.50
Ferromanganese	17 0		73.10
Rails, 60 lb. and up....	8 15	to 9 15	37.62 to 41.92
Billets	8 0	to 8 5	34.40 to 35.47
Sheet and tin plate bars,			
Welsh	8 18¾		38.43
Tin plates, base box...	1 4¼	to 1 4¾	5.21 to 5.32
Ship plates	9 10	to 10 0	1.82 to 1.92
Boiler plates	13 0	to 13 10	2.50 to 2.59
Tees	9 15	to 10 5	1.87 to 1.97
Channels	9 0	to 9 10	1.73 to 1.82
Beams	8 15	to 9 5	1.68 to 1.77
Round bars, ¾ to 3 in.	10 10	to 11 0	2.01 to 2.11
Galvanized sheets, 24 g.	18 5	to 18 10	3.50 to 3.55
Black sheets, 24 gage..	13 10	to 13 15	2.59 to 2.64
Black sheets, Japanese			
specifications	15 5		2.93
Steel hoops	12 10	& 12 15*	2.40 & 2.45*
Cold rolled steel strip,			
20 gage	17 10		3.36

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:		
Belgium	£4 3½s.	\$17.95
France	4 3½	17.95
Luxemburg	4 3½	17.95
Billets (nominal):		
Belgium	6 0	25.80
France	6 0	25.80
Merchant bars:		C. per Lb.
Belgium	6 15	1.29
Luxemburg	6 15	1.29
France	6 15	1.29
Joists (beams):		
Belgium	6 5	1.20
Luxemburg	6 5	1.20
France	6 5	1.20
Angles:		
Belgium	8 0	to £8 5s. 1.53 to 1 58
½-in. plates:		
Belgium	7 15	1.49
Germany	7 15	1.49
¾-in. plates:		
Luxemburg	7 15	1.49
Belgium	7 15	1.49

the month, through Aix-la-Chapelle, 5936 tons, or a total of 45,267 tons.

The price for coke will in future be based on that of the Office des Houillères Sinistrées, actually 143.50 fr. delivered frontier. This price will probably be augmented by 15 fr. for the distribution of the export premium, and it is generally believed that the average will reach 185 fr. per ton, on our purchases of complements in fuel (coke) abroad.

Pig Iron.—The market of pig iron continues quiet at home. For export, Lorraine has stopped taking orders. Prices are steadier on the whole, the average quotation being between 375 and 380 fr. per ton at mills. In January the price of a founders' cooperative association was 373.50 fr. One of the leading concerns in Meurthe et Moselle is asking 375 and 370 fr. for large tonnages, and this in the aim of grouping a clientele. Firmness prevails in hematite and quotations range between 450 and 475 fr. at mills, according to region and grade, and 475 and 510 fr., delivered free. Twenty tons of British hematite have been sold at 600 fr. per ton, c.i.f. Tréport.

Ferroalloys.—A general advance is recorded in the price of ferroalloys, dating Feb. 1:

Ferrosilicon

25 per cent.....	810 fr.; increase 10 fr. or 1.25 per cent
45 per cent.....	1,125 fr.; increase 25 fr. or 2.3 per cent
75 per cent.....	1,180 fr.; increase 180 fr. or 18.0 per cent
90 per cent.....	2,600 fr.; increase 400 fr. or 18.2 per cent
95 per cent.....	3,000 fr.; increase 400 fr. or 15.4 per cent

Silico-Spiegel.—Ten to 12 per cent Si., 18 to 20 per cent Mn., is sold at 810 fr., showing an increase of 10 fr.

Silico-Manganese is unaltered at 1500 fr. for the 20 to 25 per cent Si., and 50 to 55 per cent Mn.; Fr. 1550 for the 20 to 25 per cent Si. and 60 to 65 per cent Mn.

Ferrochrome

2 to 4 per cent Cr.....	2,720 fr.; increase 135 fr.
4 to 6 per cent Cr.....	2,020 fr.; increase 145 fr.
6 to 8 per cent Cr.....	1,970 fr.; increase 145 fr.
8 to 10 per cent Cr.....	1,920 fr.; increase 150 fr.

All prices delivered above 10 tons, and at works under that tonnage.

Semi-Finished Products.—A good many orders have been booked and plants now refuse to make concessions on prices. There is work for two months ahead in the plants. Inland quotations are 44 to 46 fr. for ingots; 46 to 48 fr. for blooms; 50 to 52 fr. for billets; all per 100 kg. (220 lb.) in basic Bessemer steel. Open-hearth quotes 2.5 to 3 fr. lower. There is a marked tendency to firmness on the whole.

Rolled Steels.—The market is firmer. The amount of trade secured for export being satisfactory induces some of the makers to keep their prices steady. This is not a general note, however, and we find variation in the prices—57 fr. minimum in some places and 54 fr. and even lower in others. Wire rod is equally unstable, ranging between 74 and 70 fr., according to plants. The following are recorded:

Half-finished steel, 35 x 10	98.00 fr.	Delivered Paris
Angles	65.50 to 69.75 fr.	
Angles	68.75 to 77.50 fr.	
Square steel in billets	59.00 to 60.50 fr.	
Round and flat steel	65.65 to 74.70 fr.	Delivered Rouen
Angles	74.10, 75.10, 77.00 fr.	Delivered Saintes
Round, square and flat steel	76.00 to 77.00 fr.	
Round and square steel	68.45 to 69.45 fr.	Delivered Orléans

Sheets.—The Belgian market is showing a more favorable disposition while France is just beginning to improve. Prices are a little steadier, minimum quotations at the mills being, per 100 kg. (220 lb.).

Large plates	62 to 65 fr.
Heavy sheets	63 to 66 fr.
Medium sheets	75 to 82 fr.
Light sheets	85 to 90 fr.

Foundry.—This is quiet, but with a good amount of work on hand. Prices show no alteration as a result of the cost of the raw materials being still on the same level and upward. In malleable, prices are slightly raised, due to the increased cost of imported pig-iron. In cast-steel, the situation is satisfactory.

Construction.—Mechanical construction and particularly that of machine tools, which has been practically dead since the Armistice, is now regaining some ac-

tivity on the fact that usual consumers of American machinery are now in the complete impossibility, due to the prohibitive prices, of continuing their purchases across the Atlantic, and consequently turn their attention to the French market. Special machinery alone, which is not constructed in this country, is imported. On the other hand, we hear that the Germans are inquiring for machine tools to export to Russia. In fact, for current machines, the German manufacture is actually dearer than ours, due to the increased cost of raw materials.

In shipbuilding the works are busy with orders for export, including one 16,000-ton steamer for Holland (Société des Chantiers de la Loire); three 1000-ton steamers for Great Britain (Société des Ateliers de la Gironde); two 8500-ton steamers built by the Société des Chantiers de Saint-Nazaire; two tugboats, 400 to 500 hp., for the Suez Canal (Société des Chantiers de France); while the last order booked involves the building of another steamer for Holland, 14,000 tons (Chantiers de Penhoët).

BELGIAN MARKET PRICES HIGHER

Works Well Filled with Orders—Ruhr Deliveries Hampered by Railroad Congestion

ANTWERP, BELGIUM, Feb. 9.—In general all prices have been higher than a fortnight ago. Last week the market was much firmer and this upward tendency has since been accentuated. Business is plentiful. A large number of foreign buyers place their orders now in Belgium, especially because the neighboring competition has momentarily disappeared. For the moment Lorraine works, for the small quantities of iron and steel they still offer, quote much higher prices than in Belgium. In some cases German prices are competitive; just now this is principally true for heavy sheets and beams. Belgian bars, per contra, notwithstanding their actual higher prices, are more attractive. The new prices for domestic consumption are now as follows:

	Fr.	C. per Lb.
Commercial iron No. 2.....	730	\$30.00
Commercial iron No. 3.....	750	30.80
Commercial iron No. 4.....	825	33.90
Heavy Thomas sheets.....	750	30.80 1.40
Thin Thomas sheets.....	1,000	40.90 1.86
Galvanized sheets, 1 mm.....	2,000	81.95 3.72
Bar iron, basis.....	650	26.60 1.21
Beams and U-iron, basis.....	600	24.55 1.11
Rods, open-hearth steel:		
Ordinary	650	26.60 1.21
Half hard	800	32.80 1.49
Mild	700	28.70 1.30
Special	950	38.90 1.76
Rounds	1,250	51.20 2.32
Squares	1,275	52.25 2.37
Spring steel	1,250	51.20 2.32
Galvanized wire	1,450	59.40 2.69
Barbed wire	1,500	61.85 2.81
Wire nails, basis.....	1,250	51.20 2.32
Thomas ingots	520	20.90
Thomas blooms	550	22.50
Thomas largets	600	24.55
Thomas billets	580	27.85
Rails	700	28.70

Especially sheets have gone higher. A difference such as \$1 over the prices of last week is usual, while several makers have withdrawn totally and prefer to wait and see whether this tendency to higher prices might perhaps not go on for some time. Business for export has been negotiated on the basis of prices such as fr. 750, being today \$30.75, while at this moment even \$32 or thereabouts has been asked for the inland market.

Average prices f.o.b. Antwerp for the different classes of sheets follow:

	Fr.	C. per Lb.
Bessemer sheets:		
Not under 5 mm.....	760	\$31.15 1.41
3 mm. thickness.....	850	34.85 1.58
2 mm. thickness.....	900	36.90 1.67
1½ mm. thickness.....	970	39.75 1.80
1 mm. thickness.....	1,050	43.00 1.95
5/10 mm. thickness.....	1,300	53.25 2.42
Polished Bessemer sheets, basis	1,500	61.45 2.79
S. M. sheets, not under 5 mm. thickness	770	31.55 1.43
Galvanized sheets of 1 mm. thickness	2,000	81.95 3.72
Galvanized sheets of ½ mm. thickness	2,550	104.50 4.74

German prices for the heavy material were lower. In fact, the price for 5-mm. sheets of fr. 760, as stated above, is equal to £7 4s., while £7 is a current quotation for German goods. As iron products works are still well provided with orders, they have shown higher quotations.

Average steel prices, f.o.b. Antwerp, and for good quantities and favorable specifications are:

	Fr.	\$	C. per Lb.
Beams and U-iron, basis price	620	\$25.40	1.15
Angles, basis	680	27.85	1.26
Commercial bars	680	27.85	1.26
Rods	800 to 825	33.30	1.51
Hoop iron, basis	1,000	40.95	1.86
Hoop iron, cold rolled	1,500	61.45	2.79

If compared with former prices, bars have advanced more than \$1 per ton within the last week; joists have not been favored in the same way. Competition, however, from Luxemburg and Germany for this product is especially keen, while different Belgian mills are still short of orders. Luxemburg quotes fr. 625, f.o.b. Antwerp, while German stated as a maximum £6 2½s. per ton, f.o.b., but with a long delivery.

The pig iron market has maintained nearly the same level. As a fortnight ago, notwithstanding that production exceeds demand, makers keep to their prices and prefer to stock. Inquiries, principally for America and for large tonnages, have been refused by the works for the reason that they were asked for a small concession on the asked price.

No. 3 high-phosphorus foundry iron with 2.5 to 3 per cent Si, is running between fr. 415 and 425, being \$17.25 per ton, f.o.b. Antwerp, and between \$20 and \$20.50, c.i.f., New York. Semi-phosphorus foundry pig iron, i.e., with analysis: Si, 2.5 to 3 per cent; Mn, 0.4 to 0.8 per cent; Ph, 0.4 to 0.8 per cent; S, 0.05 per cent maximum, is obtainable at \$20.50 to \$21 per ton, f.o.b. Antwerp. But this price is not attractive enough for the American market. Thomas pig iron is worth about fr. 400, or \$16.40. Large quantities of Belgian and French Thomas iron is exported to England.

Prices for domestic and industrial coals are easier. Coke is firm but unchanged. Another coke makers' syndicate will be established for March next.

Arrivals from the Ruhr would be very important but, on account of a momentary railroad obstruction, numerous cars remain at the frontier unable to proceed to their destinations.

Temporary Construction in Japan

WASHINGTON, Feb. 26.—Temporary construction continued active in Japan during January, according to a cable received by the Department of Commerce from the Acting Commercial Attache in Tokyo, although permanent reconstruction continued to mark time pending completion of Government plans for building and finance. The cable states also that some of the larger Japanese industries are placing orders abroad for necessary equipment. It is reported that the Government is considering a plan to assist in rehabilitation of private firms and individuals by means of loans through the Japan Hypothec Bank and the Industrial Bank of Japan. These loans are to be made at a low rate of interest, it being provided that the Government will insure the bank against loss. This measure, if adopted, is expected to increase imports of reconstruction materials from producers in the United States.

British Market for Hoisting and Excavating Machinery

There should be a good demand for American hoisting and excavating machinery in Great Britain if it were properly introduced, says Consul Eliot B. Coulter, London, in a report to the Department of Commerce. While at present it is only occasionally that any particular firm is in the market to purchase this class of machinery, a live agent with an advertising campaign to back him up would create a considerable demand.

MORE BUYING OF FOREIGN STEEL

Continental Material Shows as Much as \$10 Per Ton Difference—Pig Iron Almost Competitive

NEW YORK, Feb. 26.—While export trade is extremely quiet in the face of European competition, importers are active and the competition from Continental mills is extending to American domestic business. While the majority of the imports of Continental material seem to be for consumers close to Atlantic ports or situated along the Pacific Coast, the saving in cash on a purchase of a tonnage of foreign material is sufficiently great to appeal to consumers further inland. In some instances quotations are as much as \$10 per ton under the price of American mills.

Since Jan. 1 it is estimated that about 20,000 tons of Continental steel, largely French and Belgian, has been sold to American users. About 12,000 tons is reported to have been booked in the past week or ten days. One of the largest of recent purchases was by a construction company in Philadelphia, which took about 5000 tons of structural material and a car works in northern New Jersey is stated to have purchased about 1000 tons of structural steel from European mills. Some shipments have been made through Boston. A few lots of several hundred tons each have been sold by one importer into Texas and through the port of New Orleans. A fair percentage of recent business is said to have been taken by the representative of the Schneider works (France).

Sales have also been made to the Pacific Coast. Quotations, c.i.f. Pacific ports, have been made as low as 2.12c. per lb. for bars; 2.10c. per lb. on structural material; 2.42c. per lb. on plates 3/16-in. and heavier and on hoops and bands, 2.58c. to 3.83c. per lb., all these prices, duty paid. Quotations for delivery, c.i.f. Atlantic Coast, duty paid, are from \$1.50 to \$2 per ton less than for Pacific Coast delivery.

European competition in foreign markets is apparently growing extremely active. It is reported from Japanese sources that close to 100,000 tons of steel purchased on the Continent since the earthquake is being delivered or will be by the end of March. Shipments afloat or due to be delivered by April on black and galvanized sheets are estimated at about 150,000 tons. On a recent quotation to Manila, P. I., for structural steel, an American mill's price figuring back to 1.85c. per lb. base, Pittsburgh, is said to have taken the business in the face of competition of other American mills quoting in one case the equivalent of 1.90c. per lb., base, allowing usual charges for ocean transport.

Although Continental pig iron is undoubtedly exercising a depressing effect on Eastern domestic iron, importation thus far has not reached serious proportions. While one importer of Continental iron claims to be unable to quote lower than about \$24.25 per ton for a standard foundry iron of Dutch origin; \$24.25 per ton for a German foundry iron in limited tonnages; \$24.50 per ton for a German hematite iron and \$24.75 per ton for a standard foundry of French origin, another importer representing a Belgian pig iron producer claims to be able to quote as low as \$21.80 per ton, c.i.f. Atlantic port, on a foundry iron low in phosphorus. The analysis of this grade runs 2 to 3 per cent sil., 0.07 per cent phos., 0.03 per cent sul. and 0.50 to 0.80 per cent mn. Sales of small lots of Continental iron are reported to have been made to consumers in the New England district and there is evident a general interest in foreign prices among dealers.

Automobile Production in January

Production of automobiles in January is reported by the Department of Commerce at 287,296 passenger cars and 28,797 trucks, a total of 316,093 vehicles. This makes the eleventh successive month with more than 300,000 vehicles produced. The figures are about 30 per cent greater than in January last year for passenger cars and more than 4 per cent greater for trucks. Both figures represent slight additions over both November and December, but are less than the monthly production of March to October, inclusive.

TIN PLATE MAKING IN INDIA

Story of Expanding Operations and Education of Indian Workers

The Tinsplate Co. of India, Ltd., owns what is known as the Golmuri Works, located at Jamshedpur, India, 155 miles west of Calcutta, at an elevation of 535 ft. It adjoins the plant of the Tata Iron & Steel Co. and is the largest of several industries which have sprung up around the Tata Works. Golmuri is the name of an industrial town, built to house the European population, and there are also several modern villages to take care of the Eurasian and higher class Indian employees.

The plant has a capacity of 30,000 to 33,000 tons of black plate per year. Bars, electric current and water are furnished from the Tata plant. Attention was given to the layout and design of the plant that operations could be carried on under any and all conditions of climate in India. The buildings are exceptionally large and high, with wide monitors and louver siding, and spaced for maximum ventilation.

Electric drive is used throughout, and the mills are heavy and fast. The hot mill consists of six double mills, two mills per drive operated on the two-roll-three part system. The pair furnaces are continuous with hydraulic pushers, and the annealing furnace is continuous with electric pusher.

The cold rolls—four sets—are arranged in three pass tandem with conveyors between, and each set equipped with a feed conveyor.

The tinhouse installation consists of six automatic combined pickling and tinning machines, each equipped with a conveyor which delivers the plates into the warehouse, ready for inspection.

There are nine cranes and one electric hoist, which serve every department except the black pickling.

Temperature and Humidity Conditions

Great stress was laid on proper cooling and ventilation, and the hot mill in particular was provided with every possible means for elimination of heat about the men, to insure full, continuous operation, regardless of weather. During the spring and early summer of 1923 there were nine consecutive weeks during which two hot mills operated continuously, when the average maximum temperature in the shade outside for the working days constituting this nine-week period was 105.9 deg. Fahr., the highest being 112 deg. The average minimum temperature recorded outside during this same period was 84.5 deg. Later on during the rainy season two mills continued in operation when at times there was a maximum temperature outside of 85 to 95 deg., combined with a humidity of 80 to 98 per cent.

There were taken to India, in the latter part of the year 1922 and the early part of 1923, about 90 experienced tin workers from Wales for the operation of this plant. These consisted of one full crew of 54 men for 3-shift operation of one double mill, divided among experienced rollers, heaters and roll helpers, while the others were taken as heads and assistants in the various departments from the bar yard to the warehouse.

Mills Progressively Put Into Operation

The initial start on the first mill was made on Dec. 18, 1922, and the final starting up and the beginning of successful operation of this mill was on Jan. 1, 1923. On Jan. 29 the crew was divided up and two mills were started in operation. The original number of 54 Welsh workers, less those who were incapacitated by illness, and Indian help which had been broken in for the minor positions, made the complement of crew for these two mills. Two mills only were kept in operation throughout the year until Sept. 3, when the crews were again split and the third mill put in operation.

This question of breaking in additional Indian help for the various positions and the further division of the Europeans was carried on continuously until all mills were put in operation. The last four mills were put into operation in a remarkably short period of time and during the successive starting up of these last mills production was maintained at or above the average for the year. The third mill was put into operation

Sept. 3, the fourth Oct. 15, the fifth Nov. 14 and the sixth or last mill on Dec. 12, 1923. This means that in one week less than one year from the initial trial run on the first mill, sufficient Indian help had been trained to fill efficiently all the positions about the hot mills and do all the actual work with the exception of heating and finishing eight. There were left less than 48 European hot mill workers to be divided among six mills, three shifts each.

Results Achieved

For the entire year of 1923 the hot mills produced an average of 131.5 boxes of good black plate per mill per shift, 70 per cent of which was rolled 18½ in. wide and 30 per cent 20-in. wide. The Europeans had not yet become acclimated, neither were they accustomed to the severe working conditions such as exist during the Indian hot and rainy seasons. However, all mills were successfully started in spite of this and the further handicap of finally dividing the Europeans on the hot mills down to a fineness as low as 2.6 mean on the average per mill per shift, when six mills came into operation.

Great credit must be given the owners and managing agents of the Tinsplate Co. of India, Ltd., for their conception of this enterprise and their courage in starting such difficult operations in a climate as severe as India. Many condemned the idea as being impracticable and that the final result could only be failure.

The success of the plant in India has been due largely to the judgment used in its layout and design for operation in this climate; also to the very successful management of plant operations by John Leyshon, works manager; David Samson, hot mill superintendent, both with experience on mills of this type in the United States; D. Russell, superintendent of finishing department, aided by efficient and full cooperation from the heads of the other departments who were secured from Wales.

The plant for the year 1923 hot rolled 213,940 boxes of sheared and acceptable black plate, of which a total of 143,474 base boxes of prime sheets were shipped to the manufacturing plant. Several thousand additional boxes necessarily remained in the various departments of the plant at the end of the year.

Reports of the rejections of sheets at the manufacturing plant where the oil retainers are made, show a decided reduction in percentage of waste and loss due to quality, unevenness of gage and all other classifications of bad sheets, in favor of the product made at the works of the Tinsplate company compared with imported tinplate from Wales and the United States.

Perin & Marshall, 1107 Broadway, New York, were the engineers and designers of the plant, and in connection with its final construction and the initial operation, F. L. Estep, one of the partners, assisted in securing the works manager and operating force, and went to India late in 1922 in complete charge until all departments had been brought into full operation. Before long THE IRON AGE expects to describe details of construction and operation, illustrated by reproductions of drawings and photographs.

Philadelphia to Have Joint Machine-Shop Meeting

A machine-shop meeting, under the joint auspices of the machine-shop practice division of the American Society of Mechanical Engineers, the Engineers' Club and the Philadelphia section of the society, will be held in Philadelphia on March 25. The tentative program calls for a visit to the Philadelphia Navy Yard in the morning to look over the U. S. S. Dobbin, a new destroyer tender. In the afternoon two papers are planned, one by Edwin J. Armstrong of William Cramp & Sons on the machining of 70,000-hp. hydraulic turbines, followed by B. H. Blood, general manager Pratt & Whitney Co., on a subject to be announced later. After the dinner at the Engineers' Club, a paper will then be presented by W. H. Rastall, Department of Commerce, on machine tools and the export problem.

WILL MARKET RUSTLESS IRON

Ludlum Steel Co. Licenses United Alloy Steel Corporation to Make Sheets, Bars and Other Products

The Ludlum Steel Co., Watervliet, N. Y., patentee of a method of producing rustless iron under the Armstrong patents, has licensed the United Alloy Steel Corporation, Canton, Ohio. The terms of the contract are understood to call for a sliding scale of royalties based on the selling price of the product.

"Delhi" iron, the trade name adopted for the rustless product by the Ludlum Steel Co., can be produced on a commercial basis to sell for about 20c. per lb., according to P. A. E. Armstrong, vice-president of the Ludlum Steel Co. In addition to the rust resisting and other qualities of the iron, it is stated to be extremely ductile and lends itself to use in the manufacture of billets, bars, plates, shapes, sheets of various gages, etc.

It is expected that a ready market will be found for rustless iron sheets among manufacturers of kitchen utensils and small manufactured articles, for which various non-ferrous metals are now used; for roofing purposes and in the construction of Pullman and other railroad cars, as well as for bottoms of hopper cars, metal office furniture, coal chutes, tanks and wire.

Interstate Commerce Commission on Coal Rates to Buffalo

WASHINGTON, Feb. 26.—Dismissing the complaint of the Lackawanna Steel Co. and other steelmakers in the Buffalo district, the Interstate Commerce Commission last week handed down a decision holding that rates on bituminous coal from the Reynoldsville, Pittsburgh and Cambridge districts to Buffalo are not unreasonable. In the same decision, in passing upon the case of the Covert Gear Co. et al, the commission held that rates on soft coal from certain districts in western Pennsylvania and eastern Ohio to Lockport, N. Y., were not unreasonable but that they were unduly prejudicial to the extent that they exceed rates to Buffalo.

The so-called undue prejudice is to be removed not later than April 10, and covers the originating districts, the Reynoldsville, Pittsburgh and Connellsville in Pennsylvania, No. 8, and Cambridge and the middle districts of Ohio.

Steel producers had strongly urged, among other things, that on coal to Buffalo territory the rate from the Connellsville districts should be the same as the rate from the Pittsburgh district. Their first main contention was based primarily on the alleged fact that not only were the rates as between the origin district based on fixed differentials, but that there was also a fixed destination differential relationship of 15c. between Rochester, N. Y., and Buffalo, and 25c. between Buffalo and lake front points, Erie, Pa., to Lorain, Ohio, inclusive, which was entitled to preservation.

The commission said it had found that the maintenance of the Connellsville rates upon the differential basis over Pittsburgh is not unreasonable.

High Rate of Activity of Mahoning Valley Plants

YOUNGSTOWN, Feb. 26.—Operating schedules of Valley iron and steel properties continue at a high rate. Of 66 open-hearth furnaces, 61 are making steel, 96 of 120 sheet and jobbing mills are rolling and 15 of 17 tube mills.

Preparations are being made to operate the Empire and Thomas sheet mill plants, properties sold recently by the Youngstown Sheet & Tube Co., to Mahoning Valley interests. To partially offset loss of this capacity, the Sheet & Tube company has plans drawn for an eight mill sheet plant at its Brier Hill works to produce highly finished and specialized sheet stock.

Of the 45 blast furnaces in the Youngstown district,

34 are operating. The active independent sheet mill schedule in the Valley is: Youngstown Sheet & Tube Co., 22 mills; Newton Steel Co., 20; Trumbull Steel Co., 15; Republic Iron & Steel Co., 14; Sharon Steel Hoop Co., 9; Falcon Steel Co. and Mahoning Valley Steel Co., 8 each.

The Carnegie Steel Co. is operating all of its 18 bar mills in this territory, while independent bar capacity is at 70 per cent.

Puddling mill operations continue at capacity with the A. M. Byers Co. operating 88 puddle furnaces at Girard, Ohio, and the Sheet & Tube company 44 at East Youngstown.

Sheet Sales in January Exceeded Shipments

Sheet sales in January by independent manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers exceeded shipments by about 6200 tons, according to the monthly report of that organization. This was a poor showing in comparison with December, when the excess of sales over shipments was about 161,000 tons, but made a favorable comparison with January of last year, when orders ran about 3100 tons ahead of shipments. January sales fell about 115,000 tons under those of the previous month and about 8000 tons below those of January, 1923. Shipments for January this year gained 40,000 tons as compared with the previous month, but were about 20,000 tons less than in January last year. Net obligations of manufacturers as of Jan. 31, arrived at by deducting the unshipped and unsold stocks from unfilled tonnages, were 353,984, or slightly less than 1.3 months' production at the January rate.

The report for January compares with that for the previous month and the corresponding month last year, figures in net tons as follows:

	1924	1923	
	Jan.	Dec.	Jan.
Capacity	427,000	378,000	400,000
Per cent reporting..	73.5	69.8	70.8
Sales	234,858	349,446	252,489
Production	274,097	155,229	260,520
Shipments	228,660	188,600	248,337
Unfilled tonnage.....	471,053	445,167	511,346
Unshipped stocks....	79,528	59,916	99,321
Unsold stocks	37,541	44,146	32,229

Pastels Made in Steel Plants Being Shown in New York

The exhibition of pastel paintings made in iron and steel plants by Roderick D. MacKenzie has attracted much favorable notice at the Anderson Galleries, Park Avenue and Fifty-ninth Street, New York, during the past week. The paintings will be on exhibition the remainder of this week from 10 a. m. to 6 p. m. Enthusiastic admirers of Mr. MacKenzie's work have suggested that the original paintings should be purchased and placed in the National Museum at Washington. Mr. MacKenzie is not offering any of the individual paintings for sale but has taken orders for a number of replicas.

Industrial Coal Stocks

Estimating commercial stocks of coal, the Bureau of the Census and the Geological Survey together have indicated the days' supply of bituminous coal in hands of various classes of consumers from the time of the Armistice to Jan. 1 last. Steel plants are reported at the most recent date to have had a supply calculated to last 43 days. The minimum supply was shown Jan. 1, 1923, as 27 days. One year earlier the supply was estimated good for 48 days. At the time of the Armistice it was 45 days. Stocks of soft coal at industrial plants generally, Jan. 1 last, in New England, are reported to be sufficient for 90 days or more, on the average. In New York, New Jersey and Michigan the average supply was good for 60 to 90 days, while in most of the other industrial states it was for 30 to 60 days, being less than 30 days, however, in Illinois.

Iron and Steel Markets

PRODUCTION UNABATED

Little Forward Buying Except by Railroads

Pressure of European Steel Unsettling Factor —Pig Iron Dull

Steel bookings for February promise to equal those of January, the falling off in the East being offset by the sustained activity in the Middle West. Railroad purchasing is conspicuous in a market which is still one broad in scope but of small lot buying for current needs.

Speculative buying is absent and commitments for May or June delivery are as yet a small percentage of the normal seasonal volume, yet production is at a rate which, if sustained, would make a record year. Sellers are beginning to believe that price concessions might be productive of business, as would not have been the case some months ago. This view is not taken with respect to steel bars, nor to pipe, which is in strong demand, nor to rails or tin plate, on which mills are fully booked.

Counting 16,000 cars awarded in the past week, railroad car purchases in February amount to nearly 30,000. The New York Central's share of 14,500 freight cars and 243 passenger cars will call for some 225,000 tons of steel. That road increased its orders for locomotives to 170. Inquiries from other roads have appeared for 7700 cars and 215 locomotives, including 100 locomotives for Japan.

Persistent quoting on European steel is an unsettling factor in the East. Since the first of the year as much as 20,000 tons is reported sold, over one-half of it in the past ten days, but of course deliveries as yet have been inconsequential. Some of the prices named are \$8 and \$10 below American levels.

The pig iron market is dull and efforts to obtain higher prices have met with little success. A round tonnage of Continental iron is about to be imported on the Pacific Coast and the possibility of bringing European iron to the Atlantic Coast tends to check domestic prices from advancing. A few hundred tons of Lake Superior charcoal iron has been sold for shipment to Germany.

The Carnegie Steel Co. has put on another blast furnace of the Edgar Thomson group and the Republic Iron & Steel Co. has started its No. 3 Hazleton stack, making 110 furnaces out of 140 active in Pittsburgh and the Valleys.

Makers of strip steel have named ruling quotations for second quarter orders, 3c. base for hot-rolled and 5c. for cold-rolled, but keen competition, especially for the hot-rolled product, keeps the buyer in the waiting attitude.

Efforts to establish firm prices on sheet have proved so far ineffective, as concessions on both black and galvanized are obtained on fair sized orders.

Output of wire products is keeping up with a sustained demand of good proportions.

Bids on 20,000 tons of steel have been asked for the Philadelphia-Camden bridge, which with other new projects calls for a total of 45,500 tons. Awards for the week were 26,000 tons. The Tennessee Coal, Iron & Railroad Co. is to supply itself with 20 barges, taking 2500 tons of steel.

Cast iron pipe buying is heavy and prices show growing strength.

Tin plate mills are getting specifications for May shipments ordinarily not submitted earlier than March 15.

British steel makers are perturbed at Continental makers' securing substantial contracts for British colonies. South Africa has bought rails from Germany, France and Belgium at prices \$7 to \$8.50 a ton below the best British price of \$37. American mills on shapes for Manila had to dip \$10 under domestic prices. Australia is going ahead with the bridge across Sydney harbor, involving 50,000 tons of steel.

THE IRON AGE finished steel composite price remains at 2.775c. per lb., having completed eleven months of virtual stability, with a maximum variation of less than 1 per cent either side of 2.8c.

In contrast, THE IRON AGE pig iron composite price, at \$22.88, instead of \$22.86 last week, is more than 10 per cent above the price of mid-November and more than 25 per cent below the price of eleven months ago.

Pittsburgh

Pronounced Conservatism of Buyers Still Leading Feature of Market

PITTSBURGH, Feb. 26.—If the past week has brought any definite change in the steel situation, it is seen in rather more anxiety on the part of producers for business and on orders of attractive proportions there is an increased tendency to disregard what are commonly accepted as the regular market prices. This is not altogether a bearish development, because there is business to be had at price concessions today in rather marked contrast with the latter part of last year when a cut in prices probably would have produced no business. Moreover, there are some products in which this condition does not exist. Pipe prices are very firmly maintained, because there is a genuinely good demand for it and the mills are so well committed on rails and tin plate that there is no thought of lower prices, particularly on the latter, because of the very strong market for pig tin.

There is no longer any question that on sizable tonnages of plates the market is 2.40c., base Pittsburgh, and on structural beams it is admitted that an attractive order would bring out less than 2.50c., Pittsburgh. Bars, however, are very firmly held at the quoted price, although it is doubtful whether the average invoice price on current shipments is much above 2.25c., base. Makers of strips have reaffirmed present prices of 3c. base for hot-rolled and 5c. base for cold-rolled for second quarter business. Competition, however, is

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Feb. 26, 1924	Feb. 19, 1924	Jan. 29, 1924	Feb. 27, 1923
No. 2X, Philadelphia...	\$24.26	\$24.13	\$23.63	\$30.76
No. 2, Valley furnace...	23.00	23.00	23.00	28.00
No. 2, Southern, Cin'ti...	26.55	26.55	26.55	29.05
No. 2, Birmingham, Ala...	22.50	22.50	22.50	25.00
No. 2 foundry, Chicago...	24.50	24.50	24.00	30.00
Basic, del'd, eastern Pa...	22.75	22.75	22.50	28.50
Basic, Valley furnace...	22.00	22.00	22.00	27.00
Valley Bessemer, del P'gh.	25.26	25.26	24.76	30.27
Malleable, Chicago...	24.50	24.50	24.00	30.00
Malleable, Valley...	23.00	23.00	22.50	28.50
Gray forge, Pittsburgh...	23.76	23.76	23.26	29.27
L. S. charcoal, Chicago...	29.15	29.15	29.15	34.65
Ferromanganese, furnace...	107.50	107.50	107.50	107.50

Rails, Billets, Etc., Per Gross Ton:	Feb. 26, 1924	Feb. 19, 1924	Jan. 29, 1924	Feb. 27, 1923
O.-h. rails, heavy, at mill...	\$43.00	\$43.00	\$43.00	\$43.00
Bess. billets, Pittsburgh...	40.00	40.00	40.00	40.00
O.-h. billets, Pittsburgh...	40.00	40.00	40.00	40.00
O.-h. sheet bars, P'gh...	42.50	42.50	42.50	40.00
Forging billets, base, P'gh.	45.00	45.00	45.00	47.50
O.-h. billets, Phila...	45.17	45.17	45.17	47.67
Wire rods, Pittsburgh...	51.00	51.00	51.00	50.00
Skelp, gr. steel, P'gh, lb...	2.30	2.30	2.35	2.25
Light rails at mill...	2.00	2.00	2.15	2.15

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.57	2.57	2.57	2.575
Iron bars, Chicago...	2.40	2.40	2.40	2.50
Steel bars, Pittsburgh...	2.40	2.40	2.40	2.25
Steel bars, Chicago...	2.50	2.50	2.50	2.30
Steel bars, New York...	2.74	2.74	2.74	2.59
Tank plates, Pittsburgh...	2.40	2.40	2.50	2.25
Tank plates, Chicago...	2.60	2.60	2.60	2.50
Tank plates, New York...	2.64	2.64	2.74	2.59
Beams, Pittsburgh...	2.50	2.50	2.50	2.25
Beams, Chicago...	2.60	2.60	2.60	2.40
Beams, New York...	2.74	2.74	2.74	2.59
Steel hoops, Pittsburgh...	3.00	3.00	3.00	2.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Feb. 26, 1924	Feb. 19, 1924	Jan. 29, 1924	Feb. 27, 1923	
Sheets, black, No. 28, P'gh.	3.85	3.85	3.85	3.50
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	4.60
Sheets, blue an'd, 9 & 10	3.00	3.00	3.00	2.65
Wire nails, Pittsburgh...	3.00	3.00	3.00	2.80
Plain wire, Pittsburgh...	2.75	2.75	2.75	2.65
Barbed wire, galv., P'gh...	3.80	3.80	3.80	3.45
Tin plate, 100-lb. box, P'gh.	\$5.50	\$5.50	\$5.50	\$4.95

Old Material, Per Gross Ton:	Feb. 26, 1924	Feb. 19, 1924	Jan. 29, 1924	Feb. 27, 1923
Carwheels, Chicago...	\$21.00	\$21.50	\$20.50	\$27.50
Carwheels, Philadelphia...	19.50	20.00	21.00	25.00
Heavy steel scrap, P'gh...	20.50	21.00	22.00	24.00
Heavy steel scrap, Phila...	17.50	18.00	19.00	22.00
Heavy steel scrap, Ch'go...	17.50	18.00	18.50	22.00
No. 1 cast, Pittsburgh...	21.00	21.50	21.00	25.00
No. 1 cast, Philadelphia...	19.50	19.50	21.00	25.00
No. 1 cast, Ch'go (net ton)	21.00	21.00	20.50	24.50
No. 1 RR. wrot. Phila...	21.00	21.00	22.00	25.00
No. 1 RR. wrot. Ch'go (net)	15.50	15.50	15.50	19.50

Coke, Connellsville, Per Net Ton at Oven:	Feb. 26, 1924	Feb. 19, 1924	Jan. 29, 1924	Feb. 27, 1923
Furnace coke, prompt...	\$4.15	\$4.15	\$4.00	\$7.00
Foundry coke, prompt...	5.00	5.00	4.75	8.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Feb. 26, 1924	Feb. 19, 1924	Jan. 29, 1924	Feb. 27, 1923	
Lake copper, New York...	13.25	13.62½	13.00	16.87½
Electrolytic copper, refinery	12.87½	13.25	12.50	16.50
Zinc, St. Louis...	6.85	6.92½	6.50	7.60
Zinc, New York...	7.20	7.27½	6.85	7.95
Lead, St. Louis...	9.25	8.90	8.10	8.25
Lead, New York...	9.25	9.00	8.37½	8.25
Tin (Straits), New York...	55.00	53.50	48.25	45.00
Antimony (Asiatic), N. Y.	11.00	11.00	10.50	7.37½

Composite Price, Feb. 26, 1924, Finished Steel, 2.775c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Feb. 19, 1924, 2.775c. Jan. 29, 1924, 2.789c. Feb. 27, 1923, 2.631c. 10-year pre-war average, 1.689c.
These products constitute 88 per cent of the United States output of finished steel	

Composite Price, Feb. 26, 1924, Pig Iron, \$22.88 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Feb. 19, 1924, \$22.86 Jan. 29, 1924, 22.69 Feb. 27, 1923, 27.79 10-year pre-war average, 15.72
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rather keen for orders for the latter and new producers who are endeavoring to break into the market are not being allowed to take any customers away from older companies on the score of prices. Response to the naming of present prices on sheets for second quarter delivery has not been at all pronounced. Sheet users generally are not looking for any trouble about getting future supplies and with no prospect of higher prices are disposed to buy for nearby requirements and let the mills carry the stock. There is no evidence yet that makers of wire products are getting behind in their deliveries. The same conservatism that buyers have been exhibiting the past few weeks still is apparent in practically all lines of finished material. It may be that the agreement recently reached between the Union Coal Mine Operators and the United Mine

Workers of America on the wage scale has caused buyers to view the future more placidly and that they also are encouraged to adopt cautious buying policy from the developments in Washington in connection with the Naval oil land leases and the Mellon tax plan, but the most plausible explanation is found in the fact that the mills are running so smoothly, the railroads are functioning well and a belief that if there is a change in prices it may be downward.

The recent rate of steel works operations is well maintained and there have been further accessions to the list of active blast furnaces. The Carnegie Steel Co. has put on another stack of its Edgar Thomson group, and now has 49 out of 58 furnaces in production. The Republic Iron & Steel Co. yesterday put on its No. 3 furnace at Hazleton, and the number of active

furnaces in this and nearby districts now is 110 out of a total of 140. Claire furnace, Sharpsville, Pa., will be blown in early next month.

Activity still is lacking in the pig iron market and recent asking prices have been quite generally modified to levels more in line with what experience has shown can be done. Continued absence of melters from the scrap market is causing some anxiety on the part of dealers for orders and prices have further declined. The coal market has weakened perceptibly as a result of the falling away in the demand, due to the agreement on wages in the union coal fields. The coke market is firm, but efforts to secure higher prices for second quarter tonnages have not been successful since the possibility of a coal mine suspension has passed.

Pig Iron.—Business of the past week has been very largely in foundry iron and sales even of that grade have not amounted to much. Efforts to obtain \$24, Valley furnace, for No. 2 grade have been unsuccessful lately, all recent business having been at \$23. Attempt to secure \$23 for basic iron also has been without success and the common asking price now is \$22.50, but no sales are noted even at that figure. The quotation on Bessemer iron of \$22.50, Valley furnace, finds some basis in sales of small tonnages. A local user of malleable iron is asking prices on a round tonnage for second quarter delivery and has been quoted \$22.50 to \$23. We note one sale of 500 tons of gray forge iron to a Pittsburgh user at \$22.50, Valley furnace. Some small lots of low phosphorus from an Eastern furnace have sold at a delivered price of \$32.50 and some foreign iron of that grade at a delivered price of \$31.66.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$22.00 to \$22.50
Bessemer	23.50
Gray forge	22.50
No. 2 foundry	23.00
No. 3 foundry	22.50
Malleable	23.00
Low phosphorus, copper free	29.00 to 30.00

Ferroalloys.—Activity still is lacking in this market. Buyers appear to have covered their requirements for the next few months and with nothing in sight to suggest inability on the part of producers to meet all needs, there is not much concern about future supplies. Even the strike of the British dockmen has been without effect upon the ferromanganese market. Prices are unchanged. They are given on page 885.

Semi-Finished Steel.—Open market activities are limited in billets, sheet bars and slabs. The reason is that demands upon non-integrated manufacturers are not of that urgent character which forces extra purchases and shipments against contracted tonnages are proving ample. No announcement has been made as to second quarter sheet bar prices, but the common impression is that the current prices of \$42.50 Pittsburgh or Youngstown will be continued. Billets and slabs still are available at \$40. Some makers of forging billets are asking \$47.50, but no sales are reported above \$45. Fairly good day to day buying is observed in wire rods, but forward buying is light. Users of skelp are pretty well covered by contract and despite the growing demand for pipe have not yet found it necessary to seek outside supplies. Prices are given on page 885.

Wire Products.—While the demand is steadily increasing, there is no evidence that orders are exceeding shipments and the building up of backlog tonnages by the mills is proving rather a slow process. Plain wire, particularly in the rivet gages, seems to be doing better than most of the other products, but delivery promises have not yet begun to become extended to any marked degree in this or the other products. Indeed, the fact that deliveries still are prompt and the belief that higher prices are not immediately ahead account largely for the fact that buying lacks the urgent character of that of a year ago. Some low prices still are coming out on coated nails, but in other products there is fairly close observance of quotations. They will be found on page 884.

Steel Rails.—The Steel Corporation rail unit here is well provided with light rail business and has its

light rail mill running full. This is not the case, however, with the independent mills, which were slow to reduce prices and lost much of the business that was offered. The quotable market still is 2c. to 2.15c., base, but competition is keen and in a general way 2c. is the maximum price.

We quote light rails rolled from billets at 2c. to 2.15c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, \$43 per gross ton mill, for Bessemer and open-hearth sections.

Iron and Steel Bars.—There is greater firmness in steel bar prices than is noted in the other heavy tonnage products. Buyers are conservative but most of the mills have sufficient business in sight to be indifferent about further obligations except at full prices. Iron bar prices also are well maintained, although demand is steady rather than active.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold finishing of screw stock analysis, \$3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Structural Material.—Mills in this territory still are quoting 2.50c., base, for large structural beams, but are not so well supplied with business that a large tonnage would not tempt them to make concessions. Construction outlook is regarded as favorable, but the complaint is common that competition is unusually keen and prices accordingly are low. It is hard to figure how prices quoted on structural jobs recently could have been made unless some low-priced steel still is available. Plain material prices are given on page 884.

Tubular Goods.—Pipe orders still are coming in freely and in steel pipe there are suggestions that an allocation of shipments soon may be found necessary, at least in standard pipe. Jobbers are preparing for a heavy spring demand for pipe for building purposes and also are buying against the requirements of such work that has been going on where weather conditions have favored it. Evidently, there are expectations of a heavy demand for oil well pipe, since orders from jobbers serving that industry are on a rising scale. Boiler tubes still are in very light demand and there is not much stability to prices, although there have been no formal price reductions. Most jobbers are quoting the published mill discounts, indicating that actual mill prices are below those quoted. Discounts are given on page 884.

Sheets.—Formal opening of books for second quarter tonnages by the leading interest as well as by some of the independents has been unattended by any rush of buyers to cover against that period. With prices unchanged from the current quarter and the virtual assurance that they will not be higher for the coming quarter, buyers naturally feel safe in keeping down their purchases to their nearby requirements. Some good-sized orders for blue annealed sheets for use in the all-steel box cars recently placed by the Pennsylvania Railroad and the Norfolk & Western Railroad, have come out lately, one maker having taken 2000 tons from one of the successful bidders for the cars. It is claimed this business was taken at 3c., base. Although the opening of books for second quarter business came chiefly in response to inquiries from the automobile body and parts makers, those interests have not yet been active buyers. One second quarter contract for 15,000 tons of automobile body sheets is reported. New orders this month have been a little behind shipments and some makers of common finishes will need more business soon to maintain economical operation. There is some irregularity in prices, with blue annealed sheets more firmly held than other finishes. Prices are given on page 884.

Cold-Finished Steel Bars and Shafting.—Makers in this district still claim to be holding to 3c., base, in all districts, except that freight is being equalized with Chicago in competitive territory. There has been some meeting of lower prices said to have been named by a Middle Western maker, where refusal would have meant the loss of a desirable tonnage or a desirable account. The situation has become more competitive than it was recently because of the recurrence of lower prices outside this district and while 3c., base, is the prevailing price on the bulk of the tonnage, it is not the sole price

when attractive business is up. Ground shafting holds at 3.40c., base, f.o.b. mill, for lots of a carload or more.

Track Supplies.—Current business is light, but manufacturers in this district have good order books and the present dullness is not affecting prices. They will be found on page 884.

Plates.—The Steel Corporation appears to be well provided with orders, but this is not true of the independents, several of whom are keeping plate capacity engaged chiefly on skelp. Inquiries from tank builders show some improvement, as these interests expect a considerable expansion in the demand for oil storage tanks as spring approaches. Most of the sales of plates are for small lots for early delivery, and prices are more favorable to buyers than they have been. Prices are given on page 684.

Tin Plate.—There has been a noticeable increase in the pressure of container manufacturers for deliveries and some makers already are getting specifications against May shipments. Ordinarily such specifications would not be placed before March 15. The market is very firm, not only because producers are so heavily committed but because of the sustained strength of the pig tin market.

Hot-Rolled Flats.—Manufacturers are making a determined stand at 3c. base and several of the larger producers have announced that price as the one for second quarter tonnages. Most makers have a good order book and current business is fairly large, although buyers are making strong efforts to force a decline. Prices are given on page 684.

Cold-Rolled Strips.—Leading producers have announced a price of 5c. base for second quarter business, and claim that on the bulk of current business that price prevails. A good deal of contract business for the present quarter, however, was entered at 4.75c. base in some sections of the country, particularly on attractive tonnages. That price has been done recently. It is reported that some makers are making shipments by truck, and since this obviates boxing, that charge, which amounts to 25c. per 100 lb., is waived.

Bolts, Nuts and Rivets.—General adoption of a base of \$2.75 per 100 lb. for large rivets has been followed by some improvement in business, but orders for bolts and nuts are irregular, running good one day and poor the next. Invoice prices on bolts and nuts still are somewhat below quotations. Prices and discounts are given on page 684.

Old Material.—Tendency of prices still is down because of the continued paucity in consumptive demand and the anxiety of dealers to find an outlet for the material that is coming into their hands. Heavy melting steel has been offered without takers at \$21, or 50c. a ton below last week's offering price. Practically the only demand is from dealers with short sales to cover and they are not buying at all freely with so many local plants shut off from shipments by embargoes.

The Pennsylvania Railroad will receive bids until noon March 4 on 33,000 net tons of old material.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$20.50 to \$21.00
No. 1 cast, cupola size.....	21.00 to 21.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.....	22.50 to 23.00
Compressed sheet steel.....	19.50 to 20.00
Bundled sheets, sides and ends..	18.00 to 18.50
Railroad knuckles and couplers..	22.50 to 23.00
Railroad coil and leaf springs...	22.50 to 23.00
Low phosphorus blooms and billet ends.....	25.00 to 25.50
Low phosphorus plate and other material	24.00 to 24.50
Railroad malleable.....	18.50 to 19.00
Steel car axles	22.50 to 23.00
Cast iron wheels	20.00 to 20.50
Rolled steel wheels.....	22.50 to 23.00
Machine shop turnings.....	15.50 to 16.00
Sheet bar crops	22.50 to 23.00
Heavy steel axle turnings.....	18.50 to 19.00
Short shovelling turnings.....	16.00 to 16.50
Heavy breakable cast.....	19.50 to 20.00
Stove plate	16.00 to 17.00
Cast iron borings.....	16.00 to 16.50
No. 1 railroad wrought.....	15.00 to 16.00
No. 2 railroad wrought.....	20.50 to 21.00

Coal and Coke.—Spot offerings of furnace coke still are rather meager and prices hold firm at the range of a week ago. Reports that second quarter contracts have been placed at \$4.50 per net ton at ovens are not credited. So far as is known business of this sort has been at \$4.25, and we still regard that as a contract price. In the absence of improvement in the pig iron market, blast furnace interests feel that \$4.25 is as high as they should go for their coke for the next quarter, particularly in view of the fact that there is to be no suspension of mining and very low prices prevail on coking coal. Spot foundry coke holds at \$5 to \$5.50, while for tonnages for shipment over the second quarter prices range from \$5.50 to \$6.50. The coal market is very weak. Mine run steam coal now is quotable from \$1.40 to \$2, coking coal from \$1.50 to \$2.15 and gas coal from \$2.25 to \$2.50.

Pig Iron Production in Canada

In its monthly report the Dominion Bureau of Statistics states that the quantity of pig iron produced in Canada during January advanced 7 per cent over the December output of 59,622 tons to a total of 63,702 long tons in January, and represented a marked increase over the outputs in January of the last three years. The production of basic pig iron was 39,388 tons, of which 1625 tons was produced for sale, and the rest for use of the companies reporting. The output of foundry iron amounted to 14,466 long tons and malleable iron 9848 tons during the month under review. During January two furnaces were banked at Sydney, N. S., and one additional furnace was blown in at Sault Ste. Marie, Ont., resulting in five furnaces being in blast at the end of the month. Pig iron prices were reported as holding well to the December levels, as follows: No. 1 (2.25 to 2.75 silicon), and malleable, \$29.15; No. 2 (1.75 to 2.25 silicon), \$28.15, Toronto. Montreal prices: No. 1 and malleable, \$31.55; No. 2, \$30.55 per ton.

The production of 41,309 tons of steel ingots and castings in Canada during January showed little change from the output of 41,248 tons produced during December, but marked a decided advance over the quantities produced in the corresponding month of the last three years. The January production in 1923 was 48,000 tons; 1922, 33,000 tons; 1921, 40,000 tons.

Increased Production of Coke

WASHINGTON, Feb. 19.—Reflecting increased production of iron and steel, the output of by-product coke during January showed an increase of 3.1 per cent over the month preceding, says the Geological Survey. The total production was 3,094,000 net tons, the largest in any month since last October. The percentage of production to capacity was 82.8. Of 70 plants in existence, 65 were in operation and five were idle. The new plant of the Battle Creek Gas Co., with 11 Koppers ovens, at Battle Creek, Mich., which was fired up on the closing days of the old year, was in production. The production of beehive coke in January was also the largest since October. The total for the month is estimated from railroad shipments at 1,154,000 tons, an increase of 9 per cent over that of December.

To produce the coke manufactured in January required the carbonization of approximately 6,265,000 tons of coal, of which it is estimated that 4,445,000 tons were charged in by-product ovens and 1,820,000 tons in beehive ovens. In comparison with the monthly average of 6,816,000 tons for 1923, the January rate of consumption showed a decrease of 8 per cent.

Reports to *Automotive Industries* from automobile producing centers for the first part of February show an increase in operations of 12 per cent over the same period in January. There has been since no curtailment of schedules and as good a pace will be maintained through March.

Chicago

New York Central Distributes Large Car Order—Other Buyers Active

CHICAGO, Feb. 26.—The New York Central has distributed orders for 14,500 freight cars, 243 passenger cars and 101 locomotives, the latter being in addition to 69 engines recently purchased. The freight cars alone will involve a total of 217,500 tons of steel. The Santa Fe has ordered 500 additional cars, bringing its total purchases to date up to 4500. Large new inquiries which have appeared during the week give promise that car buying will continue to be a feature of the market for some time.

Outside of the tonnage which mills are booking for railroad rolling stock is a large volume of business from varied sources. Demand was never so well distributed and orders are almost entirely against specific needs. In view of the absence of speculative buying, the commitments of local mills are surprisingly large. Orders passed to entry continue to exceed shipments and in an effort to keep pace with increasing obligations the Illinois Steel Co. has raised its operating rate to 95 per cent of capacity. In the case of the Inland Steel Co. it now seems likely that some of its first quarter business in bars and structural shapes will overlap into the next quarter. Prices are firm on plates, shapes, bars and sheets; in fact, present competition is in terms of service rather than prices. Bars continue to be the leading product from the standpoint of demand, but bookings in all of the heavier commodities thus far in February are slightly larger than during the corresponding period in January.

Pig Iron.—The market is unusually quiet, with prices unchanged. A western Michigan melter has closed for 1000 tons of malleable for second quarter shipment. A local inquiry calls for 600 tons of foundry for second quarter. For a Detroit plant 300 tons of high manganese foundry is wanted. A Michigan automobile manufacturer has closed for 2000 tons of 14 to 16 per cent Bessemer ferrosilicon, of which at least 1000 tons was placed with a western electric furnace. An inquiry for 400 tons of silvery is before the trade. A Chicago melter is in the market for one carload of 10 per cent silvery and a carload of 14 to 16 per cent Bessemer ferrosilicon. On the latter, a price of \$46, delivered, has been quoted. Sales of 200 tons of Southern foundry have been made at \$23, base Birmingham, while a few carload lots have brought \$1 higher. Two hundred tons of Lake Superior charcoal have been shipped from this district to Germany.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, average— ing sil. 1.50, delivered at Chicago	\$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	25.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.50
Malleable, not over 2.25 sil.	24.50
Basic	24.50
High phosphorus	24.50
Southern No. 2	\$29.01 to 30.01
Low phos., sil. 1 to 2 per cent, copper free	33.00 to 34.00
Silvery, sil. 8 per cent	38.29

Ferroalloys.—Sales of spiegeleisen during the week aggregate 1000 tons. Domestic material is quoted at \$37, furnace, for quantities and \$40 for carloads, while foreign is offered at \$36.50 to \$37, duty paid, seaboard, for substantial lots, ranging from 200 tons upward.

We quote 80 per cent ferromanganese, \$115.06, delivered; 50 per cent ferrosilicon, \$75, delivered; spiegeleisen, 18 to 22 per cent, domestic, \$45.58 to \$48.58, delivered; foreign, \$44.06 to \$44.56, delivered.

Plates.—The plate market finds its chief stimulus in railroad car buying. Orders for car steel booked by

local mills during the week aggregate 20,000 tons. The Fruit Growers' Express has purchased 1000 tons for refrigerator cars to be built in its own shops. The Chicago Bridge & Iron Works will fabricate a gas holder, requiring 600 tons, for the Atlantic Refining Co. at Philadelphia. No oil storage tank awards are reported. Local plate prices are firm and unchanged.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Bars.—Demand for soft steel bars remains unusually active. Liberal orders are coming from all the usual sources, and business from the farm implement industry, though still below normal, is showing steady improvement. One large implement maker is booked three months ahead and has put some of its plants on a 12-hr. schedule, or three hours longer than its normal day's operations. There is some apprehension, however, lest demand for farm machinery will show a sharp drop after a fairly active spring. In fact, it is stated that these manufacturers who have not yet accumulated spring business must look forward to a dull year. Bar buyers, generally, still aim to limit their purchases to early needs, but in view of the heavily booked condition of local mills, are now finding it necessary to protect themselves farther ahead. Some of them are now sending in specifications calling for March rollings. Mills east of here continue to book limited tonnages in sizes on which Chicago producers can no longer promise early shipment. Demand for bar iron shows slight improvement, although mills have not yet accumulated much of a backlog. Rail steel bar producers are more comfortably situated.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting is 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. to 3c. base; hoops, 4.45c.; bands, 3.95c.

Bolts and Nuts.—Business is in fair volume, but the recently advanced quotations are finding little basis in sales.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to $\frac{3}{4}$ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, \$3.50 off; blank nuts, \$3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Sheets.—The local independent has followed the lead of the Steel Corporation subsidiary in opening books for second quarter at unchanged prices. Mills generally are showing a disposition to hold to those quotations and reports of price concessions are rare. While jobbers are now contracting for their requirements over the second quarter, most users are buying only against specific needs. In fact, sheet buying was never so well distributed. In the aggregate, it bulks large, but it embraces practically no speculative orders and a very small percentage of the normal spring business, calling for May and June delivery. When spring buying does develop, users may experience difficulty in obtaining the deliveries they desire, although they will probably encounter no price advances on the part of the mills.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago: 4c. for blue annealed; 4.70c. for black and 5.85c. for galvanized.

Cast-Iron Pipe.—Business is heavy, with prices steadily growing stronger. Recent lettings include:

Highland Park, Mich., 300 tons to National Cast Iron Pipe Co.

Pontiac, Mich., 600 tons to James B. Clow & Sons.

Iron Mountain, Mich., 530 tons to National Cast Iron Pipe Co.

Duluth, Minn., 700 tons to Lynchburg Foundry Co.

Jackson, Mich., 285 tons to National Cast Iron Pipe Co.

Kenosha, Wis., 400 tons to National Cast Iron Pipe Co.

Youngstown, Ohio, 600 tons, divided between James B. Clow & Sons and National Cast Iron Pipe Co.

LaCrosse, Wis., 200 tons to American Cast Iron Pipe Co.

Lima, Ohio, 700 tons to James B. Clow & Sons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$60.20 to \$61.20; 6-in. to 10-in., inclusive, \$56.20 to \$57.20; 12-in. and above, \$55.70 to \$56.20; class A and gas pipe, \$5 extra.

Rails and Track Supplies.—Outside of the appearance of a large inquiry from the Pennsylvania for tie plates, the market is devoid of important developments.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Wire Products.—New business in all common products is improving and demand for market wire continues good. On account of unabated severe weather and unfavorable economic conditions, the Northwest is still a quiet spot on the market. Operations of the leading interest average 80 per cent. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 684.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, \$3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

Structural Material.—Fabricating awards are below the recent average, but the amount of new work coming to a head is large. Bids are now being taken on the Lake Shore Athletic Club building, Chicago, requiring 4000 tons. The Union League Club, Chicago, has definitely decided to go ahead with the construction of a new building, involving 5000 tons, on which preliminary figures were taken some time ago. Final plans, however, will not be completed for several weeks. Bids are due March 1 on 150 ore pockets for the Soo line at Ashland, Wis., a project which will require 5000 tons if an all structural steel design is used or 1500 tons if part of the construction is reinforced concrete. A warehouse for the harbor department of San Pedro, Cal., will take 3000 tons. Local mills are well booked in plain material and in some sections are no longer able to make prompt deliveries. On the score of deliveries, mills east of here are finding it possible to make sales of small lots in this territory.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Reinforcing Bars.—New business continues to develop in fair volume, but not in sufficient tonnage materially to strengthen the price situation. Action on the New Palmer House, Chicago, involving 1000 tons of concrete bars, has been deferred until March 15, when new bids on the general contract will be taken. Lettings include:

Four buildings for the University of Illinois, Urbana, Ill., 350 tons to Hugh J. Baker, Indianapolis.

Ironwood, Mich., school building, 300 tons to C. A. P. Turner.

Addition to Dayton warehouse, Minneapolis, 135 tons to C. A. P. Turner.

Franklin school building, Minneapolis, 102 tons to Minneapolis Steel & Machinery Co.

Riding Club building, Chicago, 100 tons to Joseph T. Ryerson & Son.

Grabois Avenue bridge, St. Louis, 140 tons to Scullin Steel Co.

High school building, Sedalia, Mo., 150 tons to Kansas City Bolt & Nut Co.

Ford Motor Co. assembly plant, Kansas City, Mo., 150 tons divided between Truscon Steel Co. and Kansas City Bolt & Nut Co.

Louisville & Nashville Railroad warehouse, New Orleans, 200 tons to a Southern dealer.

Pending business includes:

Missouri, Kansas & Texas Railroad, warehouse, Dallas, Tex., 950 tons, Bellows & Maclay Construction Co., Dallas, low bidder on general contract.

R. R. Donnelly & Sons Co., printers, Chicago, printing plant, Twenty-first Street and Calumet Avenue, Chicago, preliminary figures being taken on 350 tons.

Old Material.—With scrap offerings heavy and consumer buying limited, the market is weaker with a number of grades quotably lower. A local mill which recently bought considerable heavy melting at \$18.50 per gross ton delivered, has succeeded in buying at least 5000 tons at \$18. Sentimentally the local situation has

been affected by weakness in centers east of here. Railroad lists include the Pennsylvania, 32,000 tons; the Burlington, 6300 tons, and the St. Paul, 1000 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$20.50 to \$21.00
Cast iron car wheels	21.00 to 21.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	27.00 to 32.00
Forged steel car wheels	21.50 to 22.00
Railroad tires, charging box size	22.00 to 22.50
Railroad leaf springs, cut apart	22.00 to 22.50
Rolls for rerolling	20.50 to 21.00
Steel rails, less than 3 ft.	22.00 to 22.50
Heavy melting steel	17.50 to 18.00
Frogs, switches and guards cut apart	19.00 to 19.50
Shoveling steel	17.25 to 17.75
Dron forge flashings	14.00 to 14.50
Hydraulic compressed sheets	15.25 to 15.75
Axle turnings	16.50 to 17.00
Steel angle bars	20.00 to 20.50
Steel knuckles and couplers	22.00 to 22.50
Coil springs	23.00 to 23.50
Low phos. punchings	19.50 to 20.00
Machine shop turnings	13.50 to 13.00
Cast borings	15.50 to 16.00
Short shoveling turnings	15.50 to 16.00
Railroad malleable	21.50 to 22.00
Agricultural malleable	20.50 to 21.00

Per Net Ton	
Iron angle and splice bars	20.50 to 21.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	29.50 to 30.00
Steel car axles	20.00 to 20.50
No. 1 busheling	15.00 to 15.50
No. 2 busheling	11.00 to 11.50
Cut forge	16.00 to 16.50
Pipes and flues	12.00 to 12.50
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 machinery cast	21.00 to 21.50
No. 1 railroad cast	19.50 to 20.00
No. 1 agricultural cast	19.50 to 20.00
Locomotive tires, smooth	18.00 to 18.50
Stove plate	17.00 to 17.50
Grate bars	16.50 to 17.00
Brake shoes	17.50 to 18.00

Receiver Appointed for Interstate Foundry Co., Cleveland

The Interstate Foundry Co., Cleveland, was placed in the hands of a receiver in the Federal Court Feb. 21 on the application of three creditors, the Stewart Furnace Co., the Cleveland-Cliffs Iron Co. and the Fisher & Wilson Co., which have claims against the foundry company aggregating over \$20,000. The petitioners at the same time asked that the foundry company be declared bankrupt, alleging that it had admitted its inability to meet its debts and its willingness to become bankrupt. Joseph Fogg, an attorney, was named receiver and will operate the foundry until the present orders on the books are filled.

The Interstate Company operates two foundries in Cleveland and one in Chicago and has a capital stock of \$200,000, of which \$180,620 is preferred and the remainder no par common. The company has been engaged largely in the manufacture of automobile castings, and it is stated that lack of working capital led to financial difficulties. Last July a reorganization was effected, and F. B. Whitlock, for many years president of the company, retired, as well as L. S. Charpie, secretary. The present officers include C. A. Sleicher, president, and H. A. Lawrence, secretary and treasurer.

Plans of Tonawanda Iron Corporation

BUFFALO, Feb. 25.—The Tonawanda Iron Corporation, subsidiary of the American Radiator Co., has one stack in operation. This stack will remain in blast until March 31 or possibly ten days after this time, when it will go out of blast for three or four months, sufficient time to enable the construction of new docks, and general remodeling of this stack, including equipment with skip hoist, leveling operations and tearing down of old bins. Later on, the other stack which has been out of blast for an extended period, will be torn down and replaced by an entirely new stack.

New York

Buying of Steel Dwindling—Moderate Demand for Pig Iron

NEW YORK, Feb. 26.—The past week has been one of very moderate buying of pig iron, with prices virtually unchanged. Owing to the stocks of pig iron on hand, particularly in eastern Pennsylvania, and to the possibility of importing iron, there seems to be no probability of domestic prices advancing. The prevailing price at Buffalo is \$22 for No. 2 plain and differentials are to a large extent disregarded in competition, but \$22.50 is usually quoted on No. 2X and \$23 on No. 1X. In eastern Pennsylvania the \$23 base price prevails. Among tonnages pending are 300 tons of foundry iron from the Farrell Foundry & Machine Co., Ansonia, Conn.; a like tonnage from the Fagan Iron Works, Jersey City, N. J.; 300 tons for the Plainfield, N. J., plant of the Niles-Bement-Pond Co., and about 4000 tons for a company whose name has not been announced. A New England consumer is reported to have closed on 1000 tons of No. 1X and to be in the market for another 1000 tons. An inquiry is pending from Newport News, Va., for 300 tons of foundry iron. Price ideas of importers in regard to foreign iron vary widely, but the foreign situation is being closely watched and it will not be surprising to see further importations. Considerable movement of iron is now taking place from the Continent to the Pacific Coast. A sale has been made of 150 tons of domestic charcoal for shipment to Germany.

We quote delivered in the New York district as follows, having added to furnace price \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25....	\$26.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75....	25.77
East. Pa. No. 2, sil. 1.75 to 2.25.....	25.27
Buffalo, sil. 1.75 to 2.25.....	26.91
No. 2X Virginia, sil. 2.25 to 2.75.....	31.44
No. 2 Virginia, sil. 1.75 to 2.25.....	30.44

Ferroalloys.—Demand for ferromanganese continues to be confined to small lots of which there have been several inquiries and sales at the minimum price of \$107.50, seaboard basis, both British and domestic alloy being involved. It is reported that there have been several bids involving at least 3000 tons at prices under the market, but that none of these have been successful. They involve deliveries in the second quarter and it has not yet developed that these have resulted in orders. The market seems therefore to be firm at \$107.50. Demand for spiegeleisen is also light and confined to small lots at prevailing quotations. No developments are noted in the ferrosilicon or ferrochromium markets.

Cast-Iron Pipe.—Demand for water pipe, chiefly from private companies, is estimated as greater than at this time last year by one maker in this district and total business booked thus far is stated to be as large as for the same period of 1923. Tenders from municipalities in the New England district are expected before long. Prices continue firm and unchanged. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$61.60 to \$63.60; 4-in. and 5-in., \$66.60 to \$68.60; 3-in., \$76.60 to \$78.60, with \$5 additional for Class A and gas pipe. The soil pipe market is quiet, jobbers apparently being well-stocked and fairly well-booked for deliveries over the next couple of months. Discounts are unchanged. We quote discounts of both Southern and Northern makers, as follows: 6-in., 29½ to 30% per cent off list; heavy, 39½ to 40% per cent off list.

Warehouse Business.—Prices of most products out of stock are firm and business is generally active. Black and galvanized sheets are being held to 4.85c. per lb. and 5.85c. per lb., base, in most cases, with a slight weakness evident in galvanized, which have been slightly shaded on occasion. Discounts on wrought iron and steel pipe are reported to be firmer than for several months and business is showing a gradual increase. Demand for structural steel continues active and with some warehouses an increase in volume of orders is noted. Despite the fact that February is a short month,

most sellers expect the volume of business to equal January.

Finished Iron and Steel.—Structural lettings, which have been the mainstay of the local steel market for several months, have dropped off considerably, but a large number of projects is still pending. Work that has been contracted for will keep fabricating shops busy for some months. Demand for all steel products is probably slightly less this month than in January. Small orders predominate and with few exceptions consumers and jobbers are buying for only a few weeks' requirements. Aside from structural jobs large tonnages are unusual. The price situation shows no further signs of weakness except perhaps in plates, which are now generally quoted at 2.30c. and 2.35c., Pittsburgh, by mills in the East. The Pittsburgh and Youngstown mills, whose prices are generally higher, are getting little or no plate business in this territory.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates, 2.64c. to 2.74c.; structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Coke.—The market is strong as a result of the recent weather conditions and in anticipation of further winter weather. Standard foundry is quotable at \$5.25 to \$5.75 per ton in carloads for prompt shipment and standard furnace is fairly firm at \$4.25 to \$4.50 per ton. By-product is quoted at \$10.91, Newark and Jersey City, N. J.

Old Material.—Weakness continues with prices on practically all grades tending downward. On heavy melting steel, \$17.50 to \$18 per ton, delivered eastern Pennsylvania consumers is the prevailing range of prices paid by dealers and brokers in this district, with \$17 the expected buying price before the week ends. Consumers are reported to have sufficient scrap for immediate needs and a fair tonnage of material is coming out at these prices. With borings and turnings no longer being accepted by western Pennsylvania consumers, who are preparing to offer lower prices, brokers selling into eastern Pennsylvania look for considerably lower prices in this district. Borings and turnings today are quotable at \$15 to \$15.50 per ton eastern Pennsylvania. Machine shop turnings are being purchased at from \$15 to \$16 per ton delivered. No shipments are reported of specification pipe, which is quotable at \$16.50 per ton delivered eastern Pennsylvania users, a nominal price. Stove plate is still quoted at \$16.50 per ton delivered to New Jersey consumers and no shipments are at present being made to Harrisburg, Pa.

Buying prices per gross ton New York follow:

Heavy melting steel, yard.....	\$13.75 to \$14.25
Steel rails, short lengths, or equivalent	14.00 to 14.50
Rails for rolling.....	18.00 to 18.50
Relaying rails, nominal.....	25.00 to 26.00
Steel car axles.....	18.00 to 19.00
Iron car axles.....	25.00 to 26.00
No. 1 railroad wrought.....	17.50 to 18.00
Forge fire	11.50 to 12.00
No. 1 yard wrought, long.....	15.00 to 16.00
Cast borings (clean).....	11.25 to 11.75
Machine-shop turnings	11.75 to 12.25
Mixed borings and turnings.....	11.75 to 12.25
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	12.75 to 13.25
Stove plate	13.50 to 14.50
Locomotive grate bars.....	14.50 to 15.00
Malleable cast (railroad).....	16.00 to 17.00
Cast iron car wheels.....	16.50 to 17.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast.....	\$20.00 to \$21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	15.50 to 16.50
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Several other projects beside the four new sheet mills at its Mercer works, Farrell, Pa., are under way with the American Sheet & Tin Plate Co. Appropriations have been granted and the work of rebuilding and modernizing the galvanizing department of the Guernsey works, Cambridge, Ohio, already is in progress. At the Cambridge works, Cambridge, Ohio, a tin plate plant, the company is rebuilding the heating furnaces, putting in a new bar shear and adding to its bar storage space and facilities.

Buffalo

Improved Demand for Finished Material— Fair Pig Iron Business

BUFFALO, Feb. 26.—The total inquiry before the furnace interests this week was slightly less than last week. It aggregated about 10,000 tons of foundry and malleable grades. In addition to this was a lot of 10,000 tons of foundry, which some producers regarded as an inquiry, but was said by others hardly to have reached that definite a stage. One inquiry for 2500 tons was placed, more than one furnace participating. Another order was for 1500 tons and others were for 1000 tons each. Inquiries still before the market include one for 1500 tons, another for 1000 tons, one for 700 tons and a few for 500 tons each. One interest booked approximately 6000 tons in all, while another placed about 3000 tons. The price quoted by one of the leading sellers remains at \$22 base for second quarter and \$23 base for first quarter. Another furnace is quoting \$22.50 for delivery throughout the first half. The differential for 2.25 to 2.75 silicon is 50c. and for 2.75 to 3.25 silicon, \$1. Under present highly competitive conditions, \$22 for No 2X and \$22.50 for No. 1X is possible.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25...	\$23.00
No. 2 foundry, sil. 2.25 to 2.75...	22.50
No. 2 plain, sil. 1.75 to 2.25...	22.00
Basic	22.00 to 23.00
Malleable	22.00 to 23.00
Lake Superior charcoal.....	29.28

Finished Iron and Steel.—The feeling of optimism in the market for finished products is the dominating factor. Sellers of almost every material report an improved demand and a better feeling as the second quarter of the year approaches. Bar material is being sought in increasing volume and the individual tonnages are larger. The same conditions apply to the sale of plates. Seneca Iron & Steel Co. has opened its books for the reception of sheet orders for second quarter at 3.85c. Most sheet mills have booked a very satisfactory tonnage for first quarter, so much so that they will be well satisfied if second quarter business is as good. Sheet inquiry runs between 200 and 300 tons and some 100-ton orders have been taken for black. Some shading is being done on prompt shipment material, which has gone in some cases for 3.75c. Shape business is improved. The steel award for the Sherwood apartments job, 200 tons, has been allotted to Buffalo Structural Steel Co. Bancroft-Jones Corporation will fabricate 900 tons for the power towers of the Niagara Falls, Lockport & Ontario Power Co. Wire and pipe business is brisk and some improvement is noted in the demand for nuts and bolts.

We quote warehouse prices, Buffalo, as follows:
Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Coke.—The market continues about the same, with a fair amount of inquiry, but no large lots sought. Foundry is being quoted by local sellers at \$5.50 to \$6.50, Connellsville, with standard furnace at \$4.25 and upward. Heating coke for salamanders is quoted at \$3.75.

Old Material.—Dealers say the market is very quiet, and not much action is looked for until the beginning of next month. Buying by mills has dwindled, these consumers having apparently sufficient stocks on hand for the next couple of weeks without further buying. One mill has been buying but only in straggling amounts. This mill has consistently declined to pay over \$18 and at that price is not able to pick up any tonnage. Dealers have paid that price and better to apply on orders by a mill a few weeks ago at \$20 to \$20.50. The price of heavy melting steel shows a considerable spread, as figured on the last sales. The highest price paid in this market lately was \$21 and the lowest price \$18. Out of town demand has dropped off, Valley and Pittsburgh points having covered. The turnings and borings market is quiet and prices have declined from 50c. to \$1.50. Low phosphorus scrap is in-

active, as steel castings plants have not materially improved their business. The prices are expected to remain firm, but no important increase is seen immediately ahead.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel.....	\$19.00 to \$20.00
Low phos., 0.04 and under.....	23.00 to 24.00
No. 1 railroad wrought.....	16.00 to 17.00
Car wheels	20.50 to 21.00
Machine shop turnings.....	12.50 to 13.00
Cast iron borings.....	14.00 to 14.50
No. 1 busheling.....	18.00 to 18.50
Stove plate	17.50 to 18.00
Grate bars	17.50 to 18.00
Bundled sheet stampings.....	14.00 to 14.50
Hydraulic compressed	18.50 to 19.00
Railroad malleable	22.00 to 23.00
No. 1 machinery cast.....	20.00 to 20.50

Birmingham

Pig Iron Sales Show Mild Improvement— Stocks Are Low

BIRMINGHAM, ALA., Feb. 26.—Sales of pig iron in the Birmingham district have been equal to and a little better than the make during the past week. Withdrawal of another company of the \$23 per ton price for No. 2 foundry being noted and easing up in activity on the part of the one remaining company at that price. Before the end of the month, the indications point to \$23.50 being minimum price on the grade of iron named. Production must be increased ere long, the surplus iron having dwindled to almost nothing on some yards while the larger producers have but a few thousand tons left. The Alabama Co. expects to be able to start up its No. 1 blast furnace at Gadsden by March 12. The Sloss-Sheffield Steel & Iron Co. has two blast furnaces ready for the torch. The Woodward Iron Co. has the second Vanderbilt furnace in shape. The president of that company would not verify report that plans are in hand for early resumption of operations at this point. Inquiries are again coming in and lots ranging from 500 to 750 and 1000 tons are being asked for. A large percentage of the probable make of pig iron in the second quarter has been sold. A sale of more than 5000 tons has been made to one of the melters in this district. Stove and heating apparatus manufacturers are to need iron on business already in hand and in sight, while the cast iron pipe makers, both pressure and soil pipe producers, have many orders to fill.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Four dry, silicon 1.75 to 2.25.....	\$23.00
Basic	23.00
Charcoal, warm blast.....	33.00

Steel Mills Busy.—The operations of steel mills in this district continue on a steady pace with shipments being made in every direction. New business for wire and nails is reported, while the rail mill at Ensley of the Tennessee Coal, Iron & Railroad Co. will be kept busy for several months. Steel fabricating plants are requiring much steel, several contracts having been taken on which will mean steady rolling and fabricating for some time. Steel bars are quoted at 2.60c., Birmingham.

Cast Iron Pipe.—Lettings for cast iron pipe, pressure pipe, for the past week were around the average, all three companies, United States Cast Iron Pipe & Foundry Co., the National Cast Iron Pipe Co., and the American Cast Iron Pipe Co. reporting orders from various directions. The American Cast Iron Pipe Co. has orders for 200 tons for Oshkosh, Wis., 410 tons for Shreveport, La., 998 tons for Los Angeles, and 490 tons for Salt Lake City, Utah. Quotations continue on the \$48 to \$49 base for 6-in. and over pressure pipe while standard soil pipe is held at \$60. Class A pipe of the pressure product is \$5 higher than class B.

We quote: 4-in. water, \$52 to \$53; 6-in., \$48 to \$49; larger sizes, \$47 to \$48; 4-in. gas, \$56; 6-in., \$52; standard sanitary pipe, \$55; heavy gage, \$45.

Coal and Coke.—The coal production in Alabama is around 360,000 to 375,000 tons a week with steady market, quotations low. Coke is firm with beehive foundry selling at \$5.50 to \$6 and by-product foundry coke at \$5 to \$6. Sales are equal to the production but output is not near capacity by any means.

Scrap Iron and Steel.—Considerable activity is still announced in cast scrap while stove plate is rather scarce. Latter product is being held at \$16.50 to \$17 and the cast at \$20. With the exception of stove plate the old material dealers have bountiful stock on yards and are able to fill orders promptly. Sales have again been consummated on which delivery will be made into the second quarter of the year.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Cast iron borings, chemical.....	\$16.00
Heavy melting steel.....	\$14.00 to 15.00
Railroad wrought.....	12.00 to 13.00
Steel axles.....	19.00 to 20.00
Iron axles.....	20.00
Steel rails.....	12.00 to 13.00
No. 1 cast.....	19.50 to 20.00
Tram car wheels.....	18.00 to 19.00
Car wheels.....	13.00 to 14.00
Stove plate.....	16.50 to 17.00
Machine shop turnings.....	7.00 to 9.00
Cast iron borings.....	9.00 to 10.00

St. Louis

Purchase by Radiator Company Followed by a Quiet Market in Pig Iron

ST. LOUIS, Feb. 26.—It is understood that the American Radiator Co. placed orders for 10,000 tons of foundry iron for second quarter delivery to two of its plants in this district, but none of the order went to the local maker or through St. Louis agencies. Shipments from the Granite City furnace are in excess of the make, specifications against contracts tending to reduce accumulated stocks considerably. An East Side melter's purchase of 500 tons was the outstanding order placed here, and there are no inquiries of consequence pending. Despite lack of interest in purchases except small lots for prompt shipment, the market continues firm. The Granite City furnace is quoting \$25.50 to \$26 there; Northern iron is at \$24.50, Chicago, and Southern, \$23 to \$24, Birmingham.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Birmingham (rail and water), \$5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25...	\$26.66
Northern malleable, sil. 1.75 to 2.25.....	26.66
Basic.....	26.66
Southern fdy., sil. 1.75 to 2.25 (rail).....	\$28.17 to 29.17

Finished Iron and Steel.—Reaffirmation of first quarter sheet prices for second quarter delivery has tended to create a better feeling in the iron and steel trade. Business, however, is still being placed on a conservative basis. Manufacturers using steel products and warehouses are buying for immediate needs. No railroad inquiries of consequence are pending.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, $\frac{7}{8}$ -in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagons blank, \$2.50, and tapped, \$2.50 off list.

Coke.—By-product coke producers in this territory are striving with all possible energy in salesmanship to reduce their piles of coke, but to little avail. Warmer weather has been one of the deterrent factors to a more rapid movement of coke, and the removal of all fear of a coal strike has been another. Dealers have bought cautiously, and producers are the ones left with the bag to hold.

Old Material.—Steel specialties have been in better demand during the last week, but generally there is not much buying by consumers in this district. Dealers still have faith in the market and the prospects for future business, and continue to take up all railroad lists offered. Rather high prices are reported to have been paid for 8000 tons sold by the Louisville & Nashville during the week, with more than half going to St.

Louis dealers. New lists include: Chicago, Burlington & Quincy, 3000 tons, and Dodge Brothers, Detroit, 2000 tons. Some items show advances.

Per Gross Ton	
Iron rails.....	\$18.00 to \$18.50
Rails for rolling.....	20.00 to 20.50
Steel rails, less than 3 ft.....	20.00 to 20.50
Relaying rails, 60 lb. and under.....	25.00 to 26.00
Relaying rails, 70 and over.....	32.50 to 33.50
Cast iron car wheels.....	21.00 to 21.50
Heavy melting steel.....	17.50 to 18.00
Heavy shoveling steel.....	17.00 to 17.50
Frogs, switches and guards cut apart.....	19.00 to 19.50
Railroad springs.....	21.50 to 22.00
Heavy axles and tire turnings.....	14.00 to 14.50
Per Net Ton	
Steel angle bars.....	17.00 to 17.50
Steel car axles.....	21.00 to 21.50
Iron car axles.....	27.50 to 28.00
Wrought iron bars and transoms.....	22.00 to 22.50
No. 1 railroad wrought.....	16.50 to 17.00
No. 2 railroad wrought.....	16.00 to 16.50
Cast iron borings.....	11.50 to 12.00
No. 1 busheling.....	15.50 to 16.00
No. 1 railroad cast.....	19.50 to 20.00
No. 1 machinery cast.....	19.50 to 20.00
Railroad malleable.....	17.00 to 17.50
Machine shop turnings.....	10.50 to 11.00
Champion bundled sheets.....	10.50 to 11.00

Boston

Eastern Pennsylvania Iron Prices Apparently Not So Strong as Heretofore

BOSTON, Feb. 26.—Eastern Pennsylvania prices apparently are not so strong as heretofore, but there has not been enough business of late to really test the pig iron market. Three furnaces are reported as offering tonnages at \$22.50 furnace base and less. Buffalo iron, on the surface, is pegged at \$23 furnace base on current business and \$22 for second quarter. Reports that \$21.50 is offered are not verified. Another week possibly will find prices more clearly defined. A Westfield, Mass., manufacturer is sounding the market, but has issued no formal inquiry or named tonnages wanted. The pig iron trade assumes 7000 tons or more of No. 2 plain will be purchased on or about March 1. For its Pittsfield, Mass., plant the General Electric Co. is inquiring on 900 tons of high silicon iron, and for its Lynn and Everett, Mass., plants on 500 tons high silicon and 450 tons low phosphorus, second quarter, purchase to be made at Schenectady. India iron sold the past fortnight at around \$24 dock Boston duty paid, silicon 2.50 to 3.00, but is not available at that price today. Continental iron has been offered in about the same basis, but imported pig really is not a market factor due to the uncertainty of foreign exchange rates. Virginia and Alabama irons are firm and inactive.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

East. Penn. sil. 2.25 to 2.75.....	\$26.65 to \$27.15
East. Penn., sil. 1.75 to 2.25.....	26.15 to 26.65
Buffalo, sil. 2.25 to 2.75.....	27.41 to 28.41
Buffalo, sil. 1.75 to 2.25.....	26.91 to 27.91
Virginia, sil. 2.25 to 2.75.....	31.42 to 32.42
Virginia, sil. 1.75 to 2.25.....	30.92 to 31.92
Alabama, sil. 2.25 to 2.75.....	33.10 to 34.10
Alabama, sil. 1.75 to 2.25.....	32.60 to 33.60

Shapes and Plates.—Mill quotations on shapes and plates remain unchanged. The demand for plates is going into consumption in small individual lots, the award of 1170 tons for the Boston & Albany Railroad station, Springfield, Mass., to Levering & Garrigues being the only notable exception. Bids will shortly be asked on 400 to 500 tons for an apartment house, 90 Commonwealth Avenue, Boston. Bids on several thousand tons have been taken, but awards are slow in developing.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. report a fair movement of by-product foundry coke from ovens to foundries on a basis of \$12.50 delivered within New England. Some recent buying was in anticipation of labor troubles at the coal mines. The demand for domestic coke has materially increased. Sentiment among by-product producers is that prices will hold firm, notwithstanding the

brighter coal mine labor situation. The sold-up condition of some of the Connellsville ovens strengthens the New England coke situation.

Warehouse Business.—Colder weather has slowed down the movement of iron and steel out of warehouses. Prices remain steady and unchanged. Cold-rolled steel, however, continues in excellent demand. Horseshoes have been advanced 75c. per keg to \$8.25 per keg base; wedges are ½c. higher at 9c. a pound; sheet lead has advanced ½c. to 16c. per lb. base; while cap and set screws are 65 and 5 per cent discount, as compared with 50 and 10 per cent heretofore.

Soft steel bars, \$3.51½ per 100 lb. base; flats, \$4.40; plain and deformed concrete bars, \$3.76½; small angles, channels and tees, \$3.51½; structural steel, large angles and beams, \$3.61½; tire steel, \$4.80 to \$5.15; open-hearth spring steel, \$5 to \$8; crucible spring steel, \$12; steel bands, \$4.31½ to \$5.20; hoop steel, \$5.80 to \$6.30; cold rolled steel, \$4.35 to \$4.85; toe calk steel, \$6.15; heavy plates, \$3.61½; light plates, \$3.86½; diamond pattern plates, stock sizes, \$5.90; blue annealed sheets, \$4.51½; refined iron bars, \$3.51½; best refined iron bars, \$4.75; Wayne, \$5.50; Norway rounds, \$6.60; Norway squares and flats, \$7.10.

Old Material.—Aside from limited buying against old contracts for shipment to eastern Pennsylvania, business in old material has dropped to almost nothing. New England yards are well sold out and little material is coming out from other sources. Prices, however, are falling under their own weight. Sealed bids closed yesterday on 800 tons cast offered by the Arsenal, Watertown, Mass. New England foundries continue to buy machinery cast sparingly, lower prices being no inducement. Apparently they are not interested in stove plate, but sales were made this week at \$12 on cars for shipment outside this territory.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$22.00 to \$22.50
No. 2 machinery cast.....	20.00 to 20.50
Stove plates	15.50 to 16.50
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$13.00 to \$13.50
No. 1 railroad wrought.....	14.50 to 15.00
No. 1 yard wrought.....	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long).....	12.00 to 12.50
Machine shop turnings.....	11.00 to 11.50
Cast iron borings, chemical.....	12.00 to 12.50
Cast iron borings, rolling mill.....	11.00 to 11.50
Blast furnace borings and turnings	10.50 to 11.00
Forged scrap and bundled skeleton	10.50 to 11.00
Shafting	17.50 to 18.00
Street car axles	17.50 to 18.00
Rails for rolling	15.00 to 15.50

Cincinnati

Pig Iron Market Quiet with Prices Fairly Well Maintained

CINCINNATI, Feb. 26.—The pig iron market was quiet in this district during the past week, it being estimated that not over 2500 tons was booked. Most of the sales were of carload lots up to 300 tons. Sales of Buffalo iron were made in the Michigan district, however, one of 1500 and one of 500 being reported. A sale of 2500 tons of 14 to 16 per cent Bessemer ferrosilicon to a Flint manufacturer was made at a delivered price around \$44.50 for electrolytic material. We also note a sale of 500 tons of Valley iron and a similar tonnage of Chicago basic iron to melters in this district. Prices are unchanged from last week, though most of the sales of southern Ohio iron were on a \$24 base. It is still possible to obtain iron in the Ironton district at \$23.50. In the South, Alabama furnaces are maintaining \$23 to \$24, but Tennessee irons can be had at \$22.50 for prompt shipment, some resale iron is being offered at slightly below furnace prices. Inquiry is light, two current being for 300 tons each for Indiana melters.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$26.55 to \$27.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.05 to 27.55
Ohio silvery, 8 per cent.....	35.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.77 to 26.27
Basic Northern	25.27
Malleable	25.77 to 26.27

Sheets.—Practically all independent mills have intimated that the lead of the American Sheet & Tin Plate Co. will be followed for second quarter as regards prices. Orders are coming through in fair volume, though there has been little done on second quarter business as yet from other than the automotive industry, which has placed some contracts.

Structural Activity.—New inquiries are few, and in this district are confined to barge work almost entirely. Lettings last week were for small tonnages. A number of projects scheduled for award have been postponed till next week. Competition is very keen for structural business, and some low prices are being quoted.

Reinforcing Bars.—Pollak Steel Co. has taken 300 tons for an addition to the Hotel Metropole, Cincinnati. A number of other projects are up for bids, and awards will likely be made this week. Prices are not strong, it being said that bars rolled from new billets have been sold at 2.15c. and rerolled bars at 2c., but these prices cannot be confirmed.

Warehouse Business.—Local warehouses report fairly good business. Wire products are improving in demand, and bars and light shapes are also moving better. There have been no price changes.

Finished Material.—The demand for bars and structural shapes continues good, but plates are quiet in this market, though increased orders are expected as a result of the activity of railroads in placing orders for equipment. Cold-finished materials continue in excellent demand. During the past week an improvement in wire products was noted, and track accessories, frogs and switches, bolts and nuts are holding up well. Prices generally are being firmly maintained, with the exception of plates, on which it is still possible to secure a price of 2.40c., Pittsburgh. Light rails are also weak, and reports are current that shading of the 2c. price has already been done.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, \$3.60 per 100 lb.; common wire nails, \$3.50 per keg base; cement coated nails, \$3.30 per keg.

Coke.—Foundry coke is in demand, and shipments are moving in good volume. Prices are also firmer. Car shortage in West Virginia and Wise County fields is reported. No change in by-product prices for March contracts is contemplated.

Connellsville furnace, \$4; foundry, \$5; New River foundry, \$11; Wise County furnace, \$4.75; foundry, \$5.50; by-product foundry, \$8, Connellsville basis.

Old Material.—The scrap market is sluggish, and sales are confined to carload lots for fill-in purposes. This is apparently true of all districts. Prices are holding up fairly well, however, and dealers paid good prices for railroad lists last week. The Pennsylvania is offering 40,000 tons. Quotations given below are nominal.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel.....	\$17.50 to \$18.00
Scrap rails for melting.....	16.50 to 17.00
Short rails	21.00 to 21.50
Relaying rails	30.50 to 31.00
Rails for rolling.....	18.00 to 18.50
Old car wheels.....	15.50 to 16.00
No. 1 locomotive tires.....	17.50 to 18.00
Railroad malleable	18.50 to 19.00
Agricultural malleable	17.50 to 18.00
Loose sheet clippings.....	12.50 to 13.00
Champion bundled sheets.....	13.00 to 13.50
Per Net Ton	
Cast iron borings.....	12.00 to 12.50
Machine shop turnings.....	11.00 to 11.50
No. 1 machinery cast.....	21.00 to 21.50
No. 1 railroad cast.....	17.50 to 18.00
Iron axles	23.50 to 24.00
No. 1 railroad wrought.....	13.00 to 13.50
Pipes and flues.....	10.50 to 11.00
No. 1 busheling.....	12.00 to 12.50
Mixed busheling	10.00 to 10.50
Burnt cast	13.00 to 13.50
Stove plate	13.50 to 14.00
Brake shoes	14.00 to 14.50

Cleveland

Finished Material Orders Numerous—Automobile Plants Busy

CLEVELAND, Feb. 26.—In finished iron and steel new business continues to come out in good volume and consumers as a rule are buying only for early requirements and want quick delivery. The volume of business during February will about equal that of January. While there have been fewer large orders this month, there has been a large number of orders. Some of the independent mills have opened their books for second quarter contracts at present prices, and while some contracts have been taken for that delivery, mills as a rule are not soliciting second quarter business and with the present attitude of consumers a rush of buyers to cover for the extended delivery is not looked for. Deliveries by some of the mills is lengthening somewhat on bars and small shapes, but these mills can still make shipments in from four to six weeks. There is an improvement in the demand for steel bars from agricultural implement manufacturers. Reports from Detroit indicate that leading automobile plants are operating at more than their usual capacity for February and some plants making parts are running overtime. March operations are expected to equal February. While the Ford Motor Co. is reported to have cut production slightly, it is operating on a daily schedule of 7500 cars, and several other leading car builders have increased their output. In spite of the heavy production, automobile companies are not releasing steel far in advance of requirements. Prices on steel bars are firm at 2.40c. The weakness in the plate market has become more pronounced and 2.40c. has become a more common quotation. Eastern mills, to meet the situation in this territory, have gone to 2.40c., Pittsburgh, although they are booking some car lots at 2.50c. There is a heavy demand from the automobile industry for light plates and a local mill is booking considerable of this business at 2.50c. A Louisville fabricator has taken oil refinery work requiring 300 tons of plates and 600 to 900 tons additional are pending for stills and other refinery work. Other inquiries for specific work include 750 tons for car dumpers and 500 tons for a coal handling plant in Japan. Little inquiry developed in the building field during the week, but a large amount of work is in prospect. On hoops and bands 3c. is still the usual quotation, but on wide hot-rolled strip steel there is still considerable price irregularity.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.75c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, \$3.50 per 100 lb.; No. 9 galvanized wire, \$3.95 per 100 lb.; common wire nails, \$3.60 base per 100 lb.

Pig Iron.—The lull in the buying movement a week ago continues. Sales in this territory during the week were very light and not much new inquiry is pending. One local producer booked about 1000 tons of foundry iron for Cleveland delivery, including one 450-ton lot. Another lake furnace sold 8000 to 10,000 tons of foundry and malleable iron during the week including one 2000-ton lot on the \$24 base. There is virtually no change in the price situation. The market lacks strength due to the competition of Buffalo iron which is still being freely offered in Ohio at \$22 furnace. Cleveland furnaces are holding to \$24 for foundry and malleable iron for local delivery, but for outside shipment a price of around \$23.50 will be quoted to meet the general price situation. In the Valley district quotations still range from \$23 to \$24, some producers holding to the latter price for the second quarter. Basic iron is inactive. A few small lot sales of Bessemer iron are reported at \$23.50 by a Valley furnace. A Wheeling, W. Va., consumer has placed 1000 tons of low phosphorus iron with an Eastern furnace and a few small lot sales are reported by a Valley producer. Southern iron is quiet. One producer this week advanced its price on Southern foundry iron

to \$23.50 for the second quarter, but \$23 is still the more common quotation.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Basic, Valley furnace.....	\$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25	24.50
Southern fdy., sil. 1.75 to 2.25...	29.00
Malleable	24.50
Ohio silvery, 8 per cent.....	36.52
Standard low phos., Valley furnace	29.00 to 30.00

Iron Ore.—Consumers have as yet shown very little interest in the iron ore market for the present year and sellers do not look for a buying movement for several weeks. Lake Superior ore consumed during January amounted to 4,687,947 gross tons, as compared with 4,478,842 tons during December, an increase of 209,105 tons. Consumption during January, 1923, was 4,998,588 tons. Furnace stocks Feb. 1 amounted to 26,453,381 tons. The amount on hand at furnaces and Lake Erie docks Feb. 1 was 33,990,820 tons, as compared with 35,150,828 tons on the same day a year ago. Ore consumption during January by interior furnaces in the central district was 2,447,731 tons, a gain of 193,394 tons over December, and lake front furnaces consumed 1,904,894 tons, a gain of 45,219 tons over the preceding month. Eastern furnaces consumed 197,087 tons, or 33,894 less than during December.

Semi-Finished Steel.—Some reservations for sheet bars for the second quarter have been made and it is expected that definite quotations will come out in a few days. The indications are that the present \$42.50 price will prevail. Some inquiries for both sheet bars and slabs for early shipment are pending. A Cleveland mill has purchased 1000 tons of off heat slabs at \$39, delivered. Car lot sales of forging billets are reported at \$45 and \$46, Pittsburgh.

Sheets.—Most of the independent mills have opened their books for second quarter contracts at present regular prices, but as a rule are not seeking contracts and very little inquiry has come out for that delivery. While the consumption in the automobile field is heavy, this industry continues to buy only for early needs. Other consuming interests appear well covered and the current demand is light. Efforts to establish prices firmly at regular quotations so far have proved ineffective, as buyers of fair-sized lots are still able to secure price concessions on black and galvanized sheets.

Reinforcing Bars.—Inquiries for small lots continue fairly heavy. Competition for business is still keen, but quotations are unchanged at 2.30c. for soft steel bars and 2.10c. for rail steel bars. The Franklin Steel Works has taken 1375 tons for extensions to the water supply system District of Columbia; the Bourne-Fuller Co. 200 tons for the Bolivar Garage, Cleveland, and the Concrete Steel Co., 180 tons for the West Street sewer, Ashtabula, Ohio.

Bolts, Nuts and Rivets.—The improved demand for bolts and nuts previously reported continues. Makers are getting a good volume of specifications on contracts and some business is being booked at the new prices. More inquiries have come out for second quarter contracts, but makers seem inclined to wait until the middle of March before opening their books. The rivet market is quiet and prices are unchanged.

Coke.—The wage agreement between the soft coal operators and miners is expected to result in a softening of coke prices, although no weakness has as yet appeared. The market is very dull with prices on foundry coke unchanged at from \$5 to \$6.50 for standard Connellsville grades.

Old Material.—Prices have further declined about 50c. a ton on nearly all grades and the market is weak and shows indications of going still lower. A Cleveland mill during the week bought several thousand tons of shoveling turnings, but this activity failed to strengthen the market and the same grade has since been offered in liberal quantities at \$15.75 and probably can be bought at \$15.50 or lower. Some of the recent

embargoes have been lifted so that scrap is moving freely to the mills. While the available supply is now plentiful, a great deal of scrap is expected to come on the market as soon as weather conditions make handling easier. The market is very dull, there being no buying by mills except that referred to above. In the Youngstown district, heavy melting steel is no longer quoted above \$21.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel.....	\$18.50 to \$18.75
Rails for rolling.....	19.25 to 19.75
Rails under 3 ft.....	21.00 to 21.50
Low phosphorus melting.....	20.75 to 21.00
Cast borings.....	14.75 to 15.00
Machine shop turnings.....	14.50 to 14.75
Mixed borings and short turnings.....	14.75 to 15.00
Compressed sheet steel.....	16.50 to 17.00
Railroad wrought.....	15.75 to 16.00
Railroad malleable.....	20.75 to 21.00
Light bundled sheet stampings.....	13.50 to 13.75
Steel axle turnings.....	15.75 to 16.00
No. 1 cast.....	21.50 to 22.00
No. 1 busheling.....	13.75 to 14.00
Drop forge flashings.....	13.25 to 13.50
Railroad grate bars.....	17.75 to 18.00
Stove plate.....	17.75 to 18.00
Pipes and flues.....	13.00 to 13.50

San Francisco

Important Building Projects Will Require Large Tonnage of Steel

SAN FRANCISCO, Feb. 20.—A good steady business is reported by both mills and foundries, and while there is a paucity of special features, the buying seems to be well distributed among practically all the leading lines, with the volume of demand centralized on both iron and steel construction commodities. Prices remain almost stationary, with scarcely any variation as compared with the last few weeks. In some instances small castings are reported a trifle lower in cost, but this is by no means general, and if in a few cases shaded figures have been accepted, there was probably some particular trade arrangement warranting such action. The increased importation of foreign iron and coke is still a noteworthy element as indicative of a more settled confidence in future business. Reports from various parts of the State show extensive preparations for new work, not only that now ready for soliciting bids, but additional contemplated plans for construction that will continue through the spring and summer. The recent award of contracts for the erection of seven buildings at the new location for the College of the Pacific at Stockton will involve the use of a large tonnage of structural steel. The Southern California Telephone Co. has just announced a \$19,000,000 construction program for 1924 which includes \$4,600,000 for wire and cables, and the enormous new plant of the White Co. of Cleveland, now being planned for the Market and Eleventh Streets site in this city, to be built this year, will also include a large quantity of structural steel. Aside from a number of new school houses for the bay region, more than a score of new manufacturing plants are being planned for this section of the State.

Pig Iron.—Nothing of importance has transpired in the general trade situation and the same favorable conditions reported two weeks ago are still maintained, with no indications of impairment. Importers say business is very fair in volume and jobbers are optimistic. Prices are still quoted around \$33 to \$34, with the latter figure firmly held for the best grades. Several round lot sales have recently been closed for prompt delivery, while the many inquiries are regarded as a most favorable factor which will later develop into actual business. Another cargo is expected within a week, the bulk of it already being sold. Advices from Los Angeles show some features of quietness, but all the plants are busy and the new bookings are sufficient to guarantee activity for some months.

Coke.—The business of the past two weeks, while probably not as extensive in bulk as for the preceding weeks, was better in some respects, in that it involved

a greater number of sales, thus showing a broader awakening of trade interest, and consequently increased business in many localities. The best grades of foreign coke are held steady at \$20, with occasional sales at 50c. higher. Moderate quantities of domestic coke figure in the sales at prices based on the Eastern rates.

Finished Steel and Iron.—Some increase in the demand is noted and it seems to be broadening out to other lines as well as the structural shapes. Prices show no material change except, perhaps, that the market undertone is stronger. The United States Cast Iron Pipe & Foundry Co. was the successful bidder for the 4300 tons of cast iron pipe for Long Beach, Los Angeles County. The bids were unusually close. Wire and nails are meeting with an unusually extensive demand, considerable quantities being for export to Hawaii and the Philippine Islands. A big order for nails for Japan is said to have been awarded in Chicago.

Old Material.—Sales continue mostly for small lots and the buying is limited, although probably a little more active than a month ago. Prices remain about the same, \$13.50 to \$14 being quoted as the figures for the most desirable grades. Available supplies are not heavy, but there is sufficient for all current requirements. Business in the southern part of the State is reported dull.

Canadian Scrap Market Shows Decided Improvement

TORONTO, Ont., Feb. 25.—The past week has seen a decided change for the better in condition in the iron and steel scrap market. Melters are showing confidence by entering the market for scrap on a more extensive scale than has been the case for several months. Trade between dealers has also strengthened as a result of improved demand from consumers. Dealers in both Toronto and Montreal markets have disposed of large tonnages of heavy melting steel during the week and buying for second quarter delivery is again featuring the market. Steel turnings are also moving more freely and some extensive tonnages of turnings have recently been contracted for. Foundry buying, however, is still backward, but inquiry from this source is improving somewhat, and machinery cast, stove plate and malleable scrap are in fair demand for spot delivery, although future buying is limited. Not only has the demand for scrap become more active but prices have also become stronger and prices on several commodities have been advanced during the week. Dealers' buying prices are as follows:

Gross Tons		
	Toronto	Montreal
Steel turnings.....	\$11.00	\$8.00
Machine shop turnings.....	10.00	7.00
Wrought pipe.....	8.00	7.00
Rails.....	14.00	12.00
No. 1 wrought scrap.....	12.00	13.00
Heavy melting steel.....	13.00	11.50
Steel axles.....	15.00	18.00
Axles, wrought iron.....	18.00	20.00
Net Tons		
Standard car wheels.....	15.00	14.00
Malleable scrap.....	15.00	15.50
Stove plate.....	16.00	14.00
No. 1 machinery cast.....	19.00	21.00

Scrap Weak at Detroit

DETROIT, Feb. 26.—With very few sales reported on old material and little tonnage being offered by dealers, the tone of the market is weak, with declines of 50c. to 75c. being registered on some grades.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel.....	\$16.75 to \$17.25
Shoveling steel.....	16.75 to 17.25
Borings.....	11.75 to 12.25
Short turnings.....	11.75 to 12.25
Long turnings.....	10.50 to 11.00
No. 1 machinery cast.....	16.50 to 17.00
Automobile cast.....	24.00 to 25.00
Hydraulic compressed.....	14.50 to 15.50
Stove plate.....	14.00 to 15.00
No. 1 busheling.....	12.00 to 12.50
Sheet clippings.....	11.00 to 11.50
Flashings.....	11.50 to 12.00

Philadelphia

Placing of Car Tonnages Weakens Plate and Shape Price—Foreign Steel Also a Factor

PHILADELPHIA, Feb. 26.—The placing of large tonnages of plates and shapes for railroad car work instead of strengthening the market, as might normally be expected, has had somewhat the opposite effect. Buyers have learned that plates for cars have been sold at 2.20c. and 2.25c., Pittsburgh, and shapes as low as 2.25c., and while it is recognized that these exceptional transactions do not "make the market," they have had an unsettling effect. The general run of plate orders are being taken at 2.30c. and 2.35c., Pittsburgh, while structural shapes are slightly stronger at 2.35c. and 2.40c., Pittsburgh.

Although very little European steel has been received in this country, the persistent quoting of prices for imported plates and shapes, especially as these prices are about 1.90c. and 2c., duty paid, Atlantic Coast ports, has not only disturbed buyers but has also caused no little concern among American producers. A fabricating company has purchased a tonnage of foreign shapes for use in the electrification project of the Virginian Railway, and some of this steel is said to be actually on the ground. In view of the fact that European steel, as quoted for delivery at Atlantic ports, is \$10 to \$12 a ton below the lowest delivered prices which have been named by domestic mills, the ultimate effect upon American prices may prove serious. It is only because European mills have been slow in making shipments that the competition has not been more severely felt up to this time.

Pig Iron.—Nearly every eastern Pennsylvania furnace has a full order book for some months, and the menace of foreign competition is growing less. It appears that a price of \$25, eastern Pennsylvania furnace, would not let in much foreign iron, quotations on the latter having advanced within the past few weeks. Efforts to obtain higher than \$23, base, for eastern Pennsylvania iron have been successful in only a small number of instances. One or two furnaces are quoting occasionally on the basis of \$23.50 for No. 2 plain and \$24 for No. 2X, but others are holding to \$23, base, which seems to be the minimum for this district, although on New England business, where competition of other districts must be met, \$22.50 furnace, might be quoted by one or two furnaces. The tendency of furnaces in this district is to quote a little higher for second quarter than for prompt shipment, the reason being that most of the furnaces are not covered for their second quarter coke and do not know what prices will be. Some coke contracts are under negotiation, and reported prices are around \$4.50, ovens. Sales of foundry iron in the past week have amounted to several thousand tons, mostly in small lots, and there have been no sales of basic. The Standish furnace has been blown in to make copper free low phosphorus iron, on which current quotations are \$27 to \$28, furnace. Copper bearing low phosphorus iron is quoted at \$27, furnace. Last week's imports of foreign iron totaled 3791 tons, all from England.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$23.76 to \$24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. 1X.....	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.17 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.67
Basic delivery eastern Pa.....	22.75 to 23.50
Gray forge	22.50 to 23.00
Malleable	23.75 to 24.25
Standard low phos. (f.o.b. furnace)	27.00 to 27.50
Copper bearing low phos. (f.o.b. furnace)	27.00 to 28.00

Ore.—It appears that practically no Lake Superior ore will come to eastern Pennsylvania merchant furnaces during the coming season. The prices quoted on lake ores for delivery in this district are so much higher than foreign ores as to be almost prohibitive. Some Eastern domestic ores are also being offered at low prices.

Ferroalloys.—Demand for ferromanganese is light. Prices for both British and domestic remain unchanged at \$107.50, seaboard or furnace.

Billets.—An improved demand for billets in small lots is noted. Prices are holding firmly at \$40, Pittsburgh, for rerolling and at \$45, Pittsburgh, for forging quality.

Plates.—While the general run of plates orders are being taken by Eastern mills at 2.30c. and 2.35c., Pittsburgh, reports of orders for car plates at 2.20c. and 2.25c., Pittsburgh, have had an unsettling effect upon buyers and the market presents every element of weakness. Eastern mills are not exceeding a 50 per cent operation and orders are coming in on a hand-to-mouth basis. One large Eastern plate mill has only 10 per cent of its open-hearth capacity in operation and has 35,000 tons of cold steel piled. Prospects for a renewal of locomotive buying offer some encouragement. The Imperial Railways of Japan are inquiring for 100 locomotives, the Southern Railway for 25, and, as reported last week, the Pennsylvania may buy 50.

Structural Material.—The Delaware River Bridge Commission has advertised for bids for 20,000 tons of steel for the suspended structure of the Philadelphia-Camden bridge. Bids close March 19. While considerable work in the Philadelphia territory has been closed within the past few weeks, the situation is in somewhat of a turmoil because of the low prices on fabricated steel quoted by one large independent fabricator. The effect of the low quotation on foreign shapes is yet to be seen, but the placing of orders for shapes for car work at 2.25c., Pittsburgh, has been unsettling. Other than this special price the market remains quotable at 2.35c. to 2.40c., Pittsburgh.

Bars.—In view of the somewhat weaker price situation on plates and shapes, steel bars remain in a fairly firm position. Orders are still being booked at 2.40c., Pittsburgh, in fact the majority of orders for merchant steel are probably at this price, but 2.35c. has been quoted to cover some large users, while 2.30c. has appeared on concrete reinforcing bars. Bar iron demand is light and prices remain at 2.25c. to 2.30c., Pittsburgh.

Sheets.—Occasional concessions of about \$2 a ton on sheets do not alter the fact that the market as a whole remains fairly close to the quotations just reaffirmed for second quarter by the American Sheet & Tin Plate Co., namely 3c. for blue annealed, 3.85c. for black and 5c. for galvanized.

Warehouse Business.—Local warehouses have reduced prices on round edge steel, both iron finished and planished. Demand continues fair. We quote for local delivery as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ½ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ½-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ½-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—The scrap market is weak and there have been reductions in prices on nearly every grade within the week. A sale of No. 1 heavy melting steel was made early last week at \$18.50, but the fact that another tonnage was sold today at \$18 indicates the extent of the market decline. With these orders out of the way, there are no buyers among the mills of eastern Pennsylvania and shippers are obliged to take what brokers are offering, \$17.50 to \$18, delivered. A large sale of blast furnace borings and turnings was made

last week at \$16, but this transaction removed consumer demand from the market and brokers are offering \$15 to \$15.50, delivered.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$17.50 to \$18.00
Scrap rails	17.50 to 18.00
Steel rails for rolling.....	21.00 to 22.00
No. 1 low phos., heavy 0.04 and under	23.00 to 24.00
Couplers and knuckles.....	22.50 to 23.50
Cast-iron car wheels.....	19.50 to 20.50
Rolled steel wheels.....	22.50 to 23.50
No. 1 railroad wrought.....	21.00 to 22.00
No. 1 yard wrought.....	18.00 to 19.00
No. 1 forge fire.....	15.00 to 15.50
Bundled sheets (for steel works)	15.00 to 15.50
Mixed borings and turnings (for blast furnace use).....	15.00 to 15.50
Machine shop turnings (for steel works use)	15.00 to 15.50
Machine shop turnings (for rolling mill use).....	15.50 to 16.00
Heavy axle turnings (or equivalent)	16.50 to 17.00
Cast borings (for steel works and rolling mills).....	15.50 to 16.00
Cast borings (for chemical plants)	18.00 to 18.50
No. 1 cast.....	19.50 to 20.50
Heavy breakable cast (for steel plants)	17.00 to 18.00
Railroad grate bars.....	17.00 to 17.50
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	18.00 to 18.50
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	23.00 to 24.00
Steel axles	23.00 to 24.00

National Industrial Conference Board and Kansas Court of Industrial Relations

The Kansas Court of Industrial Relations is the subject of a report by the National Industrial Conference Board, in which the whole history and accomplishments, the difficulties and the shortcomings which have beset the Kansas tribunal since its formation four years ago are reviewed and analyzed.

The time has been too short, the report asserts, for a conclusive appraisal of the court's value, but enough has been adduced by the survey to warrant the suggestion that the court's powers go beyond any strict construction of the public interest in Kansas industries. Furthermore, its ability to accomplish regularity and continuity of industrial production in the face of general economic conditions has not received a clear test, either legally or practically.

Whether or not the court survives, the board finds, its history and scope have been too limited to develop any body of general principles governing industrial relations, by the precedent of which disputes might settle themselves.

The Institute of Metals

The annual general meeting of the Institute of Metals will be held at the Institution of Mechanical Engineers, Storey's Gate, Westminster, on Wednesday and Thursday, March 12 and 13. The presidential address will be delivered by Prof. T. Turner, March 12. No fewer than 14 papers are due for presentation and discussion. The annual dinner will be held at the Trocadero Restaurant on Wednesday, March 12. For the first time in the institute's history, the membership passed the 1500 mark on Dec. 31, 1923.

Backlogs in Mahoning Valley

YOUNGSTOWN, Feb. 26.—District interests continue to build up comfortable backlogs of unfilled orders. The leading independent maker of lapweld pipe reports an improvement in demand and states that orders in February exceeded shipments. Current quotations in finished steel products are holding steady.

The E. W. Bliss Co., Brooklyn, on account of the large manufacturing facilities which it has in its main plant in that city, has decided to cease operations at its Salem, Ohio, plant which will probably be offered for sale, although a definite decision has not been reached.

Federated Engineers Development Corporation

The annual meeting and dinner of the advisory council of the Federated Engineers Development Corporation, 115 Broadway, New York, was held at the Engineers Club, New York, Saturday evening, Feb. 23. It was made the occasion for acquainting a number of invited guests with the aims and activities of the corporation, including an account of some of its achievements in the past year. The principal speakers were the general manager, C. Lewis Allen, who discussed the various branches of the corporation and the methods by which it assists inventors to perfect and market a proposition which has been determined by a number of its experts as worthy. He was followed by Prof. Bradley Stoughton, department of metallurgy, Lehigh University, Bethlehem, Pa., who gave an account of one of the chief developments of the past year, namely, the bringing to perfection and to a commercial stage of apparatus for the magnetic testing of steel as invented and perfected by Dr. Charles W. Burrows. Details of this commercial development were given in THE IRON AGE, Feb. 7. The chief speaker of the evening was Dr. Michael Pupin, professor of electrophysics, Columbia University, who told of his intimate relations with a former member of the Federated corporation, Dr. Charles Steinmetz, who recently died. He also spoke of some of his own experiences in inventions and patents and in the difficulty of commercializing these, and pointed to the value of such an organization in similar cases.

Production of Republic Iron & Steel Co. in Three Years

Figures covering yearly production in eight major items produced by the Republic Iron & Steel Co. during the last three years show a tremendous jump in the iron ore totals from 299,319 tons in 1921 to 1,519,348 tons (gross) in 1923. Pig iron production was tripled during the period surveyed. While the totals for Bessemer steel ingots were almost the same in 1921 and 1922, each being slightly over 122,000 tons, there was an increase in open-hearth steel ingots of nearly 400,000 tons. The total of steel ingots increased from 329,778 tons to 1,015,492 tons in the three-year period. Yearly output of finished and semi-finished products was nearly tripled from 1921 to 1923.

Comparative totals appear below.

	1923	1922	1921
Iron ore, gross tons.....	1,519,348	969,669	299,319
Coal, net tons.....	2,474,793	1,555,313	1,052,615
Coke, net tons.....	803,873	606,191	337,671
Pig iron, gross tons.....	992,033	632,498	301,080
Bessemer steel ingots, gross tons	356,919	122,013	122,068
Open-hearth steel ingots, gross tons	658,573	609,535	297,710
Total steel ingots, gross tons...	1,015,492	731,548	329,778
Finished and semi-finished products, net tons.....	971,116	733,496	336,746

Locomotives in Need of Repairs

Locomotives in need of repair on Feb. 1 totaled 10,791, or 16.8 per cent of the ownership, according to reports filed today by the carriers with the Car Service Division of the American Railway Association. This was a decrease of 550 under the number in need of repair on Jan. 15.

Serviceable locomotives in storage on Feb. 1 numbered 4,116 or 615 less than on Jan. 15. During the last 15 days in January 18,064 locomotives were repaired and turned out of the shops compared with 21,004 during the first half of the month.

The Inland Steel Co., Chicago, has contracted with Freyn, Brassert & Co., Chicago, for the installation of a Brassert gas washer at its No. 1 furnace, Indiana Harbor, Ind. With the completion of this installation the Inland Steel Co. will have all of its three furnaces equipped with Brassert washers.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. 2.40c. to 2.50c.

Structural Materials

Beams, channels, etc., base, per lb. 2.50c.
Sheet piling 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. 2.40c.
Soft steel bars for cold finishing \$3 per ton over base
Reinforcing steel bars, base, 2.40c.
Refined iron bars, base, per lb. 3.10c. to 3.15c.
Double refined iron bars, base, per lb. 4.75c.
Stay bolt iron bars, base, per lb. 7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb. 3c.
Bands, base, per lb. 3c.
Strips, base, per lb. 3c.

Cold-Finished Steel

Bars and shafting, base, per lb. 2.90c. to 3c.
Bars, S. A. E. Series, No. 2100 4.75c.
Bars, S. A. E. Series, No. 2300 6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100 5.25c. to 5.50c.
Strips, base, per lb. 4.75c. to 5.00c.

Wire Products

(To jobbers in car lots)

Nails, base, per keg \$3.00
Galvanized nails, 1 in. and over \$2.25 over base
Galvanized nails, less than 1 in. 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. \$2.75
Annealed fence wire, base, per 100 lb. 2.90
Spring wire, base, per 100 lb. 3.70
Galvanized wire No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 3.80
Galvanized staples, base, per keg 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per keg 3.45
Cement coated nails, base, per count keg \$2.60 to 2.70
Bale ties, carloads to jobbers 75 and 2 1/2 per cent off list
Woven fence, carloads (to jobbers) 67 1/2 per cent off list
Woven fence, carloads (to retailers) 65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 5 per cent off list
Machine bolts, all sizes, cut threads, 60 and 5 per cent off list
Carriage bolts, 3/4 x 6 in.:
Smaller and shorter, rolled threads, 60 and 5 per cent off list
Carriage bolts, cut threads, all sizes, 50, 10 and 5 per cent off list
Lag bolts 65 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads, 50 and 10 per cent off list
Other style heads 20 per cent extra
Machine bolts, c.p.c. and t. nuts, 3/8 x 4 in., 50 and 5 per cent off list
Larger and longer sizes 50 and 5 per cent off list
Hot pressed squares or hex. nuts, blank, 4.25c. off list
Hot pressed nuts, tapped, 4.25c. off list
C.p.c. and t. square or hex. nuts, blank, 4c. off list
C.p.c. and t. square or hex. nuts, tapped, 4c. off list
Semi-finished hex. nuts:
1/2 in. and smaller, U. S. S. 80 and 5 per cent off list
3/4 in. and larger, U. S. S. 75 and 5 per cent off list
Small sizes, S. A. E. 80, 10 and 5 per cent off list
S. A. E., 3/8 in. and larger, 75, 10 and 5 per cent off list
Stove bolts in packages, 75, 10 and 5 per cent off list
Stove bolts in bulk, 75, 10, 5 and 2 1/2 per cent off list
Tire bolts 60 and 10 per cent off list
Bolt ends with hot pressed nuts, 60 and 5 per cent off list
Bolt ends with cold pressed nuts, 50 and 5 per cent off list
Turnbuckles, with ends, 1/2 in. and smaller, 50 to 55 and 5 per cent off list
Turnbuckles, without ends, 1/2 in. and smaller, 65 and 5 to 70 and 10 per cent off list
Washers 5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

Per 1000			Per 1000		
1/4-in.	S. A. E.	U. S. S.	3/4-in.	S. A. E.	U. S. S.
1/4-in.	\$4.80	\$4.80	3/4-in.	\$15.00	\$15.00
3/8-in.	5.50	6.00	1-in.	19.50	20.00
1/2-in.	6.50	7.00	1 1/4-in.	28.50	28.50
3/4-in.	9.00	9.50	1 1/2-in.	37.00	37.50
1-in.	11.00	11.50	1 3/4-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled hex. head cap screws, 75, 10 and 5 per cent off list
Milled standard set screws, case hardened, 75, 10 and 5 per cent off list
Milled headless set screws, cut thread, 75, 10 and 5 per cent off list
Upset hex. head cap screws, U. S. S. thread, 80, 10 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread, 80, 10 and 10 per cent off list
Milled studs, 65 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. \$2.75
Small rivets 70 and 10 per cent off list

Track Equipment

Spikes, 1/2 in. and larger, base, per 100 lb. \$3.05 to \$3.15
Spikes, 1/2 in., 1/4 in. and 3/8 in., per 100 lb. 3.25 to 3.50
Spikes, 1/4 in. 3.25 to 3.50
Spikes, boat and barge, base, per 100 lb. 3.25 to 3.50
Track bolts, 3/4 in. and larger, base, per 100 lb. 4.00 to 4.25
Track bolts, 1/2 in. and 3/4 in., base, per 100 lb. 4.50 to 5.00
Tie plates, per 100 lb. 2.60
Angle bars, base, per 100 lb. 2.75

Welded Pipe

Butt Weld

Steel		Iron	
Inches	Black	Inches	Black
1/4	45	1/4 to 3/8	+11
1/4 to 3/8	51	1/2	22
1/2	56	3/4	28
3/4	60	1 to 1 1/4	30
1 to 3	62		

Lap Weld

2	55	2	23	7
2 1/2 to 6	59	2 1/2	26	11
7 and 8	56	3 to 6	28	13
9 and 10	54	7 to 12	26	11
11 and 12	53			

Butt Weld, extra strong, plain ends

1/4	41	2 to 3	61	50 1/2
1/4 to 3/8	47	1/4 to 3/8	+19	+54
1/2	53	1/2	21	7
3/4	58	3/4	28	12
1 to 1 1/2	60	1 to 1 1/2	30	14

Lap Weld, extra strong, plain ends

2	53	2	23	9
2 1/2 to 4	57	2 1/2 to 4	29	15
4 1/2 to 6	56	4 1/2 to 6	28	14
7 to 8	52	7 to 8	21	7
9 and 10	45	9 to 12	16	2
11 and 12	44			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1 1/2 points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
2 to 2 1/4 in.	27	1 1/2 in.	+18
2 1/4 to 2 3/4 in.	37	1 3/4 to 1 1/2 in.	+8
3 in.	40	2 to 2 1/4 in.	2
3 1/4 to 3 3/4 in.	42 1/2	2 1/4 to 3 in.	7
4 to 13 in.	46	3 1/4 to 4 1/2 in.	9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn		Hot Rolled	
1 in.	55	3 and 3 1/4 in.	36
1 1/4 and 1 1/2 in.	47	3 1/2 and 3 3/4 in.	37
1 3/4 in.	31	4 in.	41
2 and 2 1/4 in.	22	4 1/2 in. and 5 in.	33
2 1/4 and 2 3/4 in.	32		

3 and 3 1/4 in. 38
3 1/2 in. and 3 3/4 in. 39

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base, 83 per cent off list
Carbon 0.30 to 0.40, base, 81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2 1/4-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1 1/2-in. O.D. 9 gage	15
2 1/4-in. O.D. 12 gage	17	5/8-in. O.D. 9 gage	55
2 1/4-in. O.D. 11 gage	18	5/8-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box \$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	\$11.00	20-lb. coating I. C.	\$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed
Nos. 9 and 10 (base), per lb. 3c
Box Annealed, One Pass Cold Rolled
No. 28 (base), per lb. 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. 5.35c.
Galvanized
No. 23 (base), per lb. 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb. 5.30c.
Tin-Mill Black Plate
No. 28 (base), per lb. 3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports	
Old range Bessemer, 55 per cent iron.....	\$6.45
Old range non-Bessemer, 51½ per cent iron.....	5.70
Mesabi Bessemer, 55 per cent iron.....	6.20
Mesabi non-Bessemer, 51½ per cent iron.....	5.55
Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore	
Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian.....	11.00c.
Iron ore, Swedish, average 66 per cent iron.....	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal.....	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	42c.
Manganese ore, Brazilian or Indian, nominal.....	42c.
Tungsten ore, per unit, in 60 per cent concentrates.....	\$8.25 to \$10.00
Chrome ore, basic, 48 per cent Cr ₂ O ₃ , crude, per ton, c.i.f. Atlantic seaboard.....	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York.....	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....	\$107.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid.....	107.50
Ferrosilicon, 50 per cent, delivered.....	\$74.00 to 75.00
Ferrosilicon, 75 per cent.....	140.00
Ferrotungsten, per lb. contained metal.....	85c. to 90c.
Ferrocromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr, per lb. contained Cr, delivered.....	10.75c.
Ferrocromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr, per lb.....	10.50c.
Ferrovandium, per lb. contained vanadium.....	\$3.50 to \$4.00
Ferrocobaltitium, 15 to 18 per cent, per net ton.....	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....	\$38.00 to \$40.00
Spiegeleisen, domestic, 16 to 19 per cent.....	37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, \$42.50; 11 per cent, \$45; 12 per cent, \$47.50.	
Silvery iron, 5 per cent, \$30.00; 6 per cent, \$31.00; 7 per cent, \$32.00; 8 per cent, \$33.50; 9 per cent, \$35.50; 10 per cent, \$37.50; 11 per cent, \$40.00; 12 per cent, \$42.50.	

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	\$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	23.50
Per 1000 f.o.b. works:	
Fire Clay	
Pennsylvania.....	High Duty \$42.00 to \$45.00 Modern Duty \$37.00 to \$42.00
Maryland.....	47.00 42.00
Ohio.....	42.00 to 43.00 37.00 to 39.00
Kentucky.....	42.00 to 43.00 37.00 to 39.00
Illinois.....	37.00 to 42.00
Missouri.....	42.00 to 45.00 35.00 to 40.00
Ground fire clay, per net ton.....	6.00 to 7.00
Silica Brick:	
Pennsylvania.....	\$40.00 to 42.00
Chicago.....	49.00
Birmingham.....	50.00
Ground silica clay, per net ton.....	8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00
Chrome Brick:	
Standard size, per net ton.....	47.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$40.00
Rolling billets, 2-in. and under.....	\$40.00 to 42.50
Forging billets, ordinary carbons.....	45.00
Sheet bars, Bessemer.....	42.50
Sheet bars, open-hearth.....	42.50
Slabs.....	40.00
Wire rods, common soft, base, No. 5 to ¾-in.....	51.00
Wire rods, common soft, coarser than ¾-in.....	\$2.50 over base
Wire rods, screw stock.....	\$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40.....	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55.....	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75.....	7.50 per ton over base
Wire rods, carbon over 0.75.....	10.00 per ton over base
Wire rods, acid.....	15.00 per ton over base
Skelp, grooved, per lb.....	2.30c. to 2.35c.
Skelp, sheared, per lb.....	2.30c. to 2.35c.
Skelp, universal, per ton.....	2.30c. to 2.35c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton.....	\$43.00
Rails, light, new steel, base, lb.....	2c. to 2.15c.
Rails, light, rerolled, base, per lb.....	1.85c. to 2.00c.
Spikes, ¾-in. and larger, base, per 100 lb.....	\$3.00 to \$3.15
Spikes, ½-in. and smaller, base, per 100 lb.....	3.25 to 3.50
Spikes, boat and barge, base, per 100 lb.....	3.25 to 3.50
Track bolts, ¾-in. and smaller, base, per 100 lb.....	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.....	4.50 to 5.00
Tie plates, per 100 lb.....	2.60
Angle bars, per 100 lb.....	2.75
Bars, common iron, base, per lb., Chicago mill.....	2.40c.
Bars, common iron, Pittsburgh mill.....	2.40c.
Bars, rails, steel reinforcing, base, per lb.....	2.15c. to 2.25c.
Cold finished steel bars, base, Chicago, per lb.....	3c.
Ground shafting, base, per lb.....	3.40c.
Cut nails, base, per keg.....	\$3.15 to \$3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (½% Nickel, 10 to 20 per cent Carbon)...	\$3.50
2300 (3½% Nickel).....	\$5.00 to 5.25
2500 (5% Nickel).....	7.75 to 8.00
3100 (Nickel Chromium).....	4.00 to 4.25
3200 (Nickel Chromium).....	5.75 to 6.00
3300 (Nickel Chromium).....	8.00 to 8.25
3400 (Nickel Chromium).....	7.00 to 7.25
5100 (Chromium Steel).....	3.75
5200* (Chromium Steel).....	7.50 to 8.00
6100 (Chromium Vanadium bars).....	4.75 to 5.00
6100 (Chromium Vanadium spring steel).....	4.50 to 4.75
9250 (Silico Manganese spring steel).....	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium).....	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum).....	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum).....	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum).....	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic.....	\$0.32	Buffalo.....	\$0.265	St. Louis.....	\$0.43	*Pacific Coast.....	\$1.15
Philadelphia, export.....	0.235	Cleveland.....	0.215	Kansas City.....	0.735	*Pac. Coast, ship plates.....	1.20
Baltimore, domestic.....	0.31	Cleveland, Youngstown.....		Kansas City (pipe).....	0.705	Birmingham.....	0.58
Baltimore, export.....	0.225	Comb.....	0.19	St. Paul.....	0.60	Memphis.....	0.56
New York, domestic.....	0.34	Detroit.....	0.29	Omaha.....	0.735	Jacksonville, all rail.....	0.70
New York, export.....	0.255	Cincinnati.....	0.29	Omaha (pipe).....	0.705	Jacksonville, rail and water.....	0.415
Boston, domestic.....	0.365	Indianapolis.....	0.31	Denver.....	1.26	New Orleans.....	0.67
Boston, export.....	0.255	Chicago.....	0.34	†Denver (pipe).....	1.17		

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

FABRICATED STEEL BUSINESS

Week's Awards Total 26,000 Tons, with 45,500 Tons in New Projects

Structural work took a fresh spurt in the past week with awards of 26,000 tons and new projects in the market totaling 45,500 tons, of which 20,000 tons is for the Delaware River bridge at Philadelphia. Most of the awards of the week were under 1000 tons, but there were two of fair size, 4500 tons each.

Commercial Alcohol Co., Philadelphia, storage tanks, 1000 tons, to Chicago Bridge & Iron Works.

Public Service Corporation of New Jersey, addition to power plant at Kearny, N. J., 2400 tons, to McClintic-Marshall Co.

Indemnity Insurance Co., office building, Philadelphia, 1600 tons, to Bethlehem Steel Co.

Lewis Burke Co., meat packing building, Philadelphia, 500 tons, to McClintic-Marshall Co.

New York Central Railroad, small bridges, 700 tons, to American Bridge Co.

United Electric Light & Power Co., addition to Hell Gate power plant, 500 tons, to American Bridge Co.

Paulist Fathers' Church, New York, 400 tons, to Hay Foundry & Iron Works.

Atlantic Refining Co., 1,000,000-cu. ft. gas holder, Philadelphia, 600 tons, to Chicago Bridge & Iron Works.

Elks club house, Gary, Ind., 104 tons, to United Boiler Heating & Foundry Co.

Macalester College, St. Paul, Minn., gymnasium, 112 tons, to St. Paul Foundry Co.

Kettler-Elliott Co., Kennedy's mill bridge, Burgin, Ky., 415 tons, to Wisconsin Bridge & Iron Co.

Corn Products Refining Co., plant building, Pekin, Ill., 150 tons, to Vierling Steel Works.

Chicago, Burlington & Quincy, bridge work, 675 tons, to American Bridge Co. and 140 tons to McClintic-Marshall Co.

Pennsylvania Railroad, Fifty-fifth Street subway, Chicago, 940 tons, to McClintic-Marshall Co.

Midwest Refining Co., power house and turbine station, Casper, Wyo., 500 tons, to unnamed fabricator.

Masonic Temple, St. Louis, 4500 tons, to American Bridge Co.

Lake Shore Electric Railroad, Sandusky, Ohio, several bridges, 350 tons, to the McClintic-Marshall Co.

General Match Co., Cincinnati, 250 tons, to Pittsburgh Bridge & Iron Co.

Merkel Brothers Co., Cincinnati, pipe shop, 150 tons, to Austin Co.

U. S. Engineers' Office, Florence, Ala., power house, 305 tons, Stupp Brothers Bridge & Iron Co. low bidder.

U. S. Engineers' Office, Florence, six steel barges, approximately 1000 tons, reported Nashville fabricator low bidder.

Dam No. 34, Ohio River project, 350 tons sheet piling, to Bethlehem Steel Co.

Dams Nos. 36 and 38, Ohio River project, 1500 tons sheet piling, to Carnegie Steel Co.

Westinghouse Electric & Mfg. Co., transformer buildings, Sharon, Pa., 4500 tons, to American Bridge Co.

Michigan School of Mines, Marquette, Mich., additional building, 200 tons, to Lakeside Bridge & Steel Co.

Atwater Kent Mfg. Co., Philadelphia, manufacturing building, 1800 tons, to Shoemaker Bridge Co.

Knights of Columbus building, Columbus, Ohio, 600 tons, general contract awarded to Moran Construction Co.

Shower Brothers, Bloomington, Ill., building, 100 tons, to Massillon Bridge & Structural Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

State of Maine Highway Commission, bridge in Hancock County, 700 tons.

Hotel at Sea Gate, Coney Island, New York, 900 tons.

Brick loft, 247 West Thirty-seventh Street, 3000 tons.

Loft building at 252 West Thirty-eighth Street, 600 tons.

Paterson telephone building, Paterson, N. J., 100 tons.

Highbridge (Bronx) telephone building, 400 tons.

Loft building at West Thirtieth and Thirty-first Streets, 3000 tons.

Twelve-story loft building, 243 West Thirtieth Street, 500 tons.

Schools Nos. 77 and 214, New York, 1000 tons each.

Two Minskoff apartment houses, corner Eighty-ninth Street and Amsterdam Avenue, 1000 tons each.

Michigan Central grade separation work, Spring Wells, Mich., 650 tons, M. E. White Co., Chicago, low bidder on general contract.

Harbor Department, San Pedro, Cal., building, 3000 tons.

Minneapolis, St. Paul & Sault Ste. Marie (Soo Line), 150

ore pockets. Ashland, Wis., 1500 tons or 5000 tons, according to alternate designs.

Lake Shore Athletic Club building, Chicago, 4000 tons, bids being taken.

Grand Trunk, grade separation in Detroit district, 450 tons.

Libbey-Owens Sheet Glass Co., Toledo, Ohio, revised plans issued, 2000 tons.

Delaware River Bridge Commission, Widener Building, Philadelphia, suspended structure for Philadelphia-Camden bridge (contract No. 14), 20,000 tons, bids closing March 19.

Apartment building, Nineteenth and Spruce Streets, Philadelphia, 1000 tons.

RAILROAD EQUIPMENT BUYING

New York Central Orders 101 Locomotives and 14,500 Freight Cars

The long-expected orders of the New York Central Railroad for locomotives and cars were placed this week, 101 locomotives and 14,500 freight cars being contracted for. This brought the total of locomotives ordered during the week to 109 and the cars ordered totaled 15,934. Inquiries for 7700 cars are in the market, the Louisville & Nashville having issued an inquiry for 5000. Inquiries for 215 locomotives are pending, 100 of these being for the Imperial Railways of Japan.

The Louisville & Nashville Railroad is inquiring for 1650 box cars, 1000 automobile cars, 1100 composite gondolas, 1100 steel gondolas, 150 flat cars and 34 passenger cars, a total of 5034.

The Southern Railway has inquired for 50 passenger cars in addition to the 2000 freight cars mentioned last week.

The Maine Central has ordered 6 150-ton Mikado type and 2 140-ton Pacific type engines from the American Locomotive Co.

The Atchison, Topeka & Santa Fe has placed 500 flat cars with the American Car & Foundry Co.

The Empire Tank Line Co., a subsidiary of the Cities Service Co., has ordered 370 tank cars from the American Car & Foundry Co.

The New York Central has placed orders for 101 Mikado locomotives, of which 61 will be built by the American Locomotive Co. and 40 by the Lima Locomotive Co.

The Southern Railway is in the market for 30 locomotives. The Imperial Railways of Japan have inquired in the United States for prices on 100 locomotives.

Orders for cars distributed by the New York Central Lines, as thus far reported, total 14,500 cars, of which the American Car & Foundry Co. and the Standard Steel Car Co. will each build 5500, the Pressed Steel Car Co. 2500, and the Merchants' Despatch 1000 refrigerator cars. The probable steel requirements for these cars come close to 200,000 tons.

The New York Central has also awarded a total of 243 passenger cars. Of this number orders for 173 were mentioned in this column last week, but the distribution was not correct as given. The orders for the 243 cars were divided as follows: 90 baggage cars and 15 coaches to the American Car & Foundry Co.; 23 combination passenger and baggage cars to the Pressed Steel Car Co.; 50 coaches and 15 dining cars to the Pullman Co., and 50 coaches to the Standard Steel Car Co.

In addition to 1000 automobile cars mentioned last week, the Missouri Pacific is inquiring for 500 box, 300 composite gondola and 250 all-steel gondola cars.

The Northern Pacific is inquiring for 10 all-steel baggage cars.

The Lehigh Valley has placed repairs on 300 box cars with the American Car & Foundry Co.

The Delaware, Lackawanna & Western is inquiring for 500 automobile cars.

The East Jersey Railroad & Terminal Co. has ordered 64 tank cars of 10,000-gal. capacity from the American Car & Foundry Co.

The Canadian National is inquiring for 1000 box and 150 Hart convertible cars.

The Louisville & Nashville is inquiring for 30 locomotives. The Florida East Coast is inquiring for 25 locomotives.

The Seaboard Air Line is inquiring for 30 engines.

The Southern Pacific is inquiring for 10 interurban passenger cars, 4 steel passenger coaches, 5 chair and 4 baggage and mail cars.

The Missouri Pacific is inquiring for repairs on 1000 freight cars.

The Nashville, Chattanooga & St. Louis has placed car repairs, requiring 1500 tons of plates, with the Chickasaw Shipbuilding & Car Co.

The Ottawa Electric Railway has placed 15 steel cars, costing \$300,000, with the Ottawa Car Co.

NON-FERROUS METALS

The Week's Prices

	Cents per Pound for Early Delivery							
	Copper, New York		Tin Straits		Lead		Zinc	
	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis	
Feb. 20.....	13.50	13.12½	54.25	9.25	9.25	7.20	6.85	
21.....	13.50	13.12½	54.25	9.25	9.25	7.15	6.80	
23.....	13.50	13.00	9.25	9.25	7.17½	6.82½	
25.....	13.37½	13.00	54.12½	9.25	9.25	7.20	6.85	
26.....	13.25	12.87½	55.00	9.25	9.25	7.20	6.85	

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Feb. 26.

All the markets are considerably quieter than during the past few weeks. A lessened demand for copper has resulted in lower prices. The tin market continues at high levels. There is no let-up in the scarcity of lead which is again higher, but the zinc market has turned quiet and lower.

Copper.—The recent advance in the electrolytic copper market was undoubtedly due in part to advancing prices in London. Recently the London market has declined and the same influence has been a factor in the market on this side, although not the sole influence. Consumers, however, are watching both markets carefully and, sensing the possibility of a reaction, have been keeping out of the market as much as possible during the past week. As a result of this and other causes electrolytic copper has declined since a week ago more than ½c. per lb., until today the minimum quotation is 13.12½c., delivered, or 12.87½c., refinery. There is but little activity and both consumers and sellers are evidently waiting for either a turn in the market or the certainty that the bottom has been reached on this movement. It is believed that there is still a liberal potential demand yet to be filled as consumers are evidently covering only for fairly nearby requirements.

Tin.—The Straits tin market early last week, particularly on Feb. 18, 19 and 20, was quite active and it is estimated that 1500 to 2000 tons changed hands. On Feb. 20 the largest sales were made, amounting to 600 to 700 tons, including 300 tons sold on the New York Metal Exchange. In all these transactions, the bulk of the business was trading between dealers, consumers absorbing only a small amount of metal. There is apparently no uneasiness as to supplies among consumers due partly, according to one authority, to the bearish attitude of some interests. On Thursday, Feb. 21, it developed that one dealer sold, a day or so previous, 300 tons of futures at 53c. and later there were public sales on the New York Metal Exchange at about 54c. The day preceding the holiday, Washington's Birthday, was quiet, as was also Feb. 23. Yesterday, Feb. 25, the market was very quiet with only about 100 tons changing hands but prices, however, were firm. Today the market has been only moderately active, with spot Straits tin quoted at 55c., New York. On Friday, Feb. 22, the London market broke £4 per ton, but yesterday it advanced £1 per ton and today £5 to £6 per ton, with spot standard quoted at £280 15s., future standard, £279 10s. and spot Straits at £281 10s. Arrivals thus far this month have been 7095 tons, with 6600 tons reported afloat.

Lead.—On Feb. 21 the leading interest again raised its contract price to 8.70c., New York, but it is understood that it is selling to only a few customers at this price. In the outside market there is practically no spot or February metal available and very little March delivery can be obtained. Even the supplies of April shipment are very scarce. For this position offerings have been made at the equivalent of 9.45c., New York, and small lots have sold at 9.87½c. Manifestly quotations which would represent a normal market are impossible. They range anywhere from 9.25c. to 9.50c., both New York and St. Louis.

Zinc.—The prime Western zinc market has turned easy in the past week and prices are slightly lower.

Lower prices at London have been one influence and the slackening of domestic demand has been another. The appearance within the last day or so of a large consumer who is also a large producer of zinc has tended to stiffen the market, as it is not known yet just how much of a factor this consumer-producer may be. Last Thursday prime Western sold as low as 6.80c., St. Louis, but the price today is firm at 6.85c., St. Louis, or 7.20c., New York.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by leading producers. In the outside market both shot and ingot nickel are quoted at 28c. to 32c. per lb.

Antimony.—The market continues tight and wholesale lots of Chinese metal for early delivery are quoted at 11c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27.50c. to 28c. per lb., duty paid, by importers who are able to obtain it from their foreign principals.

Old Metals.—Business is dull and values practically unchanged. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire.....	11.50
Copper, light and bottoms.....	10.25
Heavy machine composition.....	10.50
Brass, heavy	8.00
Brass, light	6.25
No. 1 red brass or composition turnings..	9.25
No. 1 yellow rod brass turnings.....	7.50
Lead, heavy	8.00
Lead, tea	6.75
Zinc	5.00
Cast aluminum	18.50
Sheet aluminum	18.50

Chicago

Feb. 26.—The metals are generally less active and copper and tin have declined. In some quarters it is felt that the Teapot Dome scandal has had an adverse effect on business, but others believe it too early to draw such a conclusion. Lead has advanced because of pronounced scarcity. The old metals remain unchanged. We quote in carload lots: Lake copper, 13.50c.; tin, 55.25c.; lead, 9.75c.; spelter, 6.95c.; antimony, 12.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.50c.; red brass, 9c.; yellow brass, 7.25c.; lead pipe, 7.25c.; zinc, 4.25c.; pewter, No. 1, 29c.; tin foil, 35c.; block tin, 42c.; all buying prices for less than carload lots.

Future Meetings of American Electrochemists

The annual spring meeting of the American Electrochemical Society will be held at the Bellevue-Stratford Hotel, Philadelphia, April 24 to 26. Two symposiums are scheduled for this convention, one on organic electrochemistry and another on recent progress in electro deposition with special reference to the commercial phase of the production of copper, tin and zinc. A round table discussion on refractories for electric furnaces, similar to the one held at the meeting in Dayton on electric brass furnace melting practice, and also another round table discussion on electro deposition are to be features of the convention. There is also scheduled a session on electric furnace problems.

It is announced that the annual fall meeting will be held in Detroit, Oct. 2, 3 and 4. A symposium on electric industrial heating, which is a conspicuous phase of industry in Detroit, will be a feature of the program.

Real earnings increased 7.8 per cent in 1923, according to a study made by the National Industrial Conference Board, New York. This is based on an increase of 7.2 per cent in average weekly earnings and a slight decrease in the cost of living, thus enhancing the purchasing value of the average pay envelope. Compared with July, 1914, the purchasing power of average weekly wages has increased 38 per cent.

PERSONAL

H. S. Jacoby, for the past six years secretary and chief engineer of the H. K. Ferguson Co., engineer and contractor, Cleveland, has been elected vice-president of that company in charge of sales. Mr. Jacoby is a graduate of Cornell University and comes from a family of prominent engineers, his father having served as professor of bridge engineering in Cornell until his retirement in 1921. Mr. Jacoby served for two years as chief engineer for the Standard Steel Construction Co. in Canada and later was connected with the Austin Co., Cleveland, and was that company's district engineer in charge of work in the Cleveland territory. For the present Mr. Jacoby will remain at the head of the company's engineering department as well as having charge of sales.



H. S. JACOBY

J. W. Bell, who was consulting engineer in charge of the tin plate plant development in India for Perin & Marshall from June 1, 1922, until the completion of the plant, arrived in the United States on Feb. 5 from England on a business visit preparatory to establishing himself in London as a member of Douglass & Bell, marine and mechanical engineers.

H. H. Davis, who as briefly announced in THE IRON AGE of Feb. 21, has been appointed general manager of sales for the Molybdenum Corporation of America, Pittsburgh, has been identified with the alloy steel and ferroalloy business since 1907, the year following his graduation from Stevens Institute of Technology. He became identified with the Railway Steel Spring Co. in 1907 as a designing engineer, later becoming assistant purchasing agent, then assistant to the vice-president in charge of operations. He severed that connection in 1912 to accept a position with the Crucible Steel Co. of America in its spring department, and in 1914 became assistant to George M. Sargent, then vice-president in charge of alloy steels of that company. In 1916 he was made assistant general sales agent in charge of alloy steel sales at Pittsburgh, and in 1922 became assistant general manager of sales for the Pittsburgh Crucible Steel Co., a subsidiary of the Crucible Steel Co. of America.

A. J. Boynton, for four years vice-president and general manager Woodward Iron Co., Woodward, Ala., has severed that connection and joined the firm of H. A. Brassert, Inc., consulting and operating engineer, Chicago. Prior to his association with the Woodward company, Mr. Boynton was for many years at the Lorain works of the National Tube Co., ten years as blast furnace superintendent, and four years as superintendent of docks, coke plant and blast furnaces.

Francis D. Bowman of the Carborundum Co., Niagara Falls, N. Y., will give an illustrated lecture on Niagara Falls power developments and the manufacture of carborundum before the Chicago Foundrymen's Association at the City Club, Chicago, Thursday evening, Feb. 28.

H. C. Thomas has resigned as vice-president and assistant general manager of the United Alloy Steel Corporation, Canton, Ohio, which position he had held for 18 months. He will take an extended vacation and will sail from Los Angeles in March for a trip around the world. At a farewell dinner his associates presented him a gold watch as a token of their esteem. The duties formerly falling to Mr. Thomas will be divided among

the key men of the operating committee, composed of the executives of the various divisions of the corporation.

John N. Early was elected president of the W. J. Early Sons Foundry Corporation, Pittsburgh, for the current year, at a meeting held Feb. 21. Lee H. Marshall was elected vice-president and Charles G. Mahey, secretary-treasurer.

J. L. Adams, district sales manager at Cincinnati for the Bethlehem Steel Co., has resigned, effective March 1, and will open an office in Cincinnati for the sale of iron and steel products. He is well known in iron and steel circles in the Middle West, having been connected with the industry practically his entire life. He was first associated with the Globe Rolling Mill Co., later joining the forces of the Cambria Steel Co. and the Midvale Steel & Ordnance Co. and served as manager of sales in Cincinnati for the two latter companies. Upon their absorption by the Bethlehem Steel Corporation, Mr. Adams retained his position as district manager until his resignation. He will be succeeded in the Cincinnati office by John Hennessy, now connected with the Bethlehem Steel Co. at Chicago.

L. A. Holmes of the McClintic-Marshall Co., Boston, has resigned to engage in business at Pottstown, Pa. Ralph Riddle, formerly with the company in New York, has assumed the Boston position left vacant by Mr. Holmes.

George A. Morison, secretary Bucyrus Co., South Milwaukee, Wis., has been chosen one of 18 nominees from whom will be elected six overseers of Harvard University by a mail ballot of 41,000 alumni. The result will be made public at the time of the annual commencement exercises in June.

Thomas H. Dietz has been transferred to the Philadelphia branch of the Walworth Mfg. Co., Boston, as sales engineer in charge of sales of the company's engineering specialties.

F. E. Moskovics of Indianapolis, formerly vice-president Nordyke & Marmon Co., has been elected second vice-president and director of the H. H. Franklin Mfg. Co., builder of the Franklin automobile. He is now acting as receiver for the Stevenson Gear Co., Indianapolis.

H. A. Shier, district sales manager at Pittsburgh for the Onondaga Steel Co., Syracuse, N. Y., will sever this connection, effective March 1, to take up the duties of district sales manager at Pittsburgh for the steel sales department of Henry Disston & Sons, Inc., Philadelphia. He has represented the Onondaga company for eight years and prior to that was with the Bethlehem Steel Co. in the tool steel sales department for the past eight years.

F. B. Zopf, for the past 20 years identified with the Riter-Conley Co., Pittsburgh, and for the past 10 years as sales engineer for that company, has been appointed general sales manager of the Youngstown Boiler & Tank Co., Youngstown, Ohio, with headquarters at the home office.

Martin J. Lide, consulting engineer, Birmingham, Ala., is scheduled to speak before a meeting of the American Society of Mechanical Engineers at the Hillman Hotel, Birmingham, March 19, on powdered coal and waste heat dryers.

S. Wells Utley, vice-president and general manager Detroit Steel Castings Co., Detroit, was reelected president of the Employers' Association of Detroit at its annual meeting.

Judge Elbert H. Gary left Lima, Peru, Wednesday of last week and arrived at Valparaiso Wednesday of this week. Tuesday, March 4, he will start by rail for Buenos Aires, where he will arrive March 6 after crossing the main divide of the Andes.

C. I. Ilgenfritz has resigned as vice-president of the Stroh Ilgenfritz Co. to become assistant purchasing agent of the Youngstown Sheet & Tube Co., effective March 1. He was formerly purchasing agent of the Brier Hill Steel Co.

OBITUARY

Dr. Joseph Struthers

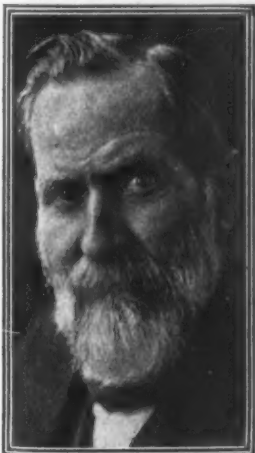
Dr. JOSEPH STRUTHERS, secretary of the Engineers' Club since 1909, and treasurer of the United Engineering Societies since 1910, whose death was noted briefly



DR. JOSEPH STRUTHERS

in THE IRON AGE of last week, was born in New York on Nov. 13, 1865. In 1885 he was graduated from the Columbia School of Mines with the degree Ph.B. in chemistry, and ten years later received the degree Ph.D. from that institution. After five years, beginning in 1895 as instructor in metallurgy at Columbia, he became honorary lecturer in the same department for two years, and during his connection with the university organized its first summer school in practical metallurgy at Butte, Mont. His extensive survey included plants in both America and Europe. Mr. Struthers was appointed chairman of the mines and metallurgy section of the Jamestown Exposition in 1907 and his varied contact with mining activities caused his services to be sought by the United States Geological Survey and the Census Bureau. He was assistant secretary of the American Institute of Mining Engineers under Dr. R. W. Raymond, when he was editor of the society's publications. Later Mr. Struthers became secretary, editor and assistant treasurer of the American Institute of Mining Engineers from 1911 to 1913, and since 1916 had been treasurer of the Engineering Foundation. Mr. Struthers was author of a "Quiz Compend of Chemistry and Physics," and was editor of several bulletins on engineering subjects.

PLIMMON HENRY DUDLEY, an outstanding figure in the field of the technology of railroad tracks and structures, died on Feb. 25 at the Hotel Commodore, New



PLIMMON HENRY DUDLEY

York. He had been consulting engineer for the New York Central Railroad since 1880, and devoted a lifetime to making rail transportation safe. He was one of the foremost American authorities on railroad engineering and on steel rails in particular, and developed early in his career such useful devices as the dynamometer applied to the track indicator, which was employed to detect track defects. The first 6-in. 100-lb. rail was introduced by Dr. Dudley, as was the invention of the stremmatograph, used to obtain and register strains in rails under moving trains. He was appointed reporter from the United States on the "Nature of the Metal for Rails" to the International Railway Congress held at Paris in 1900. From his investigations with the stremmatograph he arrived at the principles governing the American theory and practice of railroads in reference to the conjoint action of locomotives, rolling stock and permanent way. He was born in Freedom, Ohio, in 1843, received the degree Ph.D. from Hiram (Ohio) College, and became chief engineer of what was known as the Valley Railroad in 1872.

He was a member of the American Institute of Mining and Metallurgical Engineers, the Society of Arts, London, and the American Society for Testing Materials. His work on the application of magnetic testing to rails was of great value and his contributions to technical literature were numerous as well as of a high order.

W. H. MURPHY, treasurer Williamson Heater Co., Cincinnati, died at his home in that city Feb. 12. He had been connected with the Williamson company for 25 years.

EDMOND B. ROBERTS, a vice-president and secretary of Henry Disston & Sons, Inc., died at his home in Philadelphia, Feb. 22. Mr. Roberts' health had been failing



EDMOND B. ROBERTS

for some time, but he had been at his desk only three weeks previously. Death was due to bronchial pneumonia. The career of Mr. Roberts constituted a romance of modern business. In 1890 he joined the Disston organization as an office boy, at the age of 15 years. His ability soon won for him a position assisting the secretary of the company, where his efficiency brought steady advancement. In 1908 he was appointed assistant secretary, and in 1914 made secretary and a vice-president of the company, continuing in these capacities until his death. Mr.

Roberts' work had to do principally with the financial affairs of the corporation, and he became a prominent figure in manufacturing circles. He was a member of the Union League and the Manufacturers' Club of Philadelphia, and took an active part in movements to promote better conditions in manufacturing and in improving trade conditions. In the hardware, lumber and steel industries Mr. Roberts had many friends. Mr. Roberts was born in Philadelphia, Sept. 17, 1875. He is survived by his wife, Mrs. Ida de V. Roberts, and a brother, Elmer S. Roberts.

CHARLES J. VOGT, for the last 20 years president of the Buffalo Galvanizing & Tinning Works, died on Feb. 22 at his home, 85 Woodward Avenue, Buffalo.

EDWIN A. AMADEN, general superintendent of warehouses throughout the United States for the Carnegie Steel Co., died Feb. 24, at his home in Pittsburgh. He had been associated with the Carnegie Steel Co. for 25 years, having begun as a draftsman. He was born in Edgerton, Ohio, 59 years ago, and resided in Pittsburgh about 20 years.

Cost of living figures of the National Industrial Conference Board, New York, show a slight reduction in January, as compared with December, due to lower food and fuel costs, partly offset by increased cost of clothing. The January figure is 64.6 per cent above July, 1914, compared with 65 per cent in December. The reduction from the high costs prevailing in July, 1920, has been 19.5 per cent.

A pressure controlled speed regulating panel for automatically governing boiler steam pressure by the control of the speed of the motor-driven forced draft blower is now marketed by the General Electric Co. This new device is known as the CR-7731-A1, and is similar to the type which it supersedes.

The Inland Steel Co. expects to place in operation two of four open-hearth furnaces and a new blooming mill at Indiana Harbor between April 15 and May 1. The remaining two open-hearth furnaces and a new 14-in. merchant mill are expected to be completed by May or June.

Machinery Markets and News of the Works

RAILROAD INQUIRY CONTINUES

Southern Railway List of 101 Items Chief Feature of Machine-Tool Market

February Not as Good a Month as Expected in Volume of Sales, but Prospects Are Encouraging

The Southern Railway inquiry for machine tools, totaling 101 items, which was published in full on page 597 of the Feb. 21 issue of THE IRON AGE, is the chief feature of the market. This equipment is required for the new shops of the road to be built at North Birmingham, Ala.

The Chesapeake & Ohio's long expected list may be issued in a week or 10 days and the Louisville & Nashville is also expected to issue a large inquiry shortly.

The Atchison, Topeka & Santa Fe has added nine items to its already large pending list. The Canadian National Railways have issued a fair-sized inquiry on which a number of American tool builders are quoting.

February sales of machine tools have not been up to expectations, but inquiry is holding up fairly well and this lends some encouragement to the situation.

Orders have been somewhat more numerous in the Chicago territory, and some of the Cincinnati companies report a slight improvement particularly for lathes, radial drills, milling machines and planers.

New York

NEW YORK, Feb. 26.

THE Southern Railway list, published on page 597 of the Feb. 21 issue of THE IRON AGE, furnishes the chief item of interest in the Eastern machine-tool situation. In addition to machine tools the Southern is also in the market for 11 electric traveling cranes, which will be purchased by Dwight P. Robinson & Co., New York. Orders for machine tools during the week were in fair volume, but business is not developing as the trade hoped it would. Prospective buyers are rather slow to close and "bargain hunting" results in the sale of a considerable number of used tools in place of new tools.

One order of the past week was for about 10 small lathes. Other orders were: Pittsburgh Plate Glass Co., Pittsburgh, 6-ft. radial drill; Consolidated Mining Co. of Canada, 5-ft. radial drill; Pennsylvania Railroad 42-in. boring mill; Downingtown Mfg. Co., East Downingtown, Pa., 100-in. boring mill; Hendrie & Bolthoff Co., Denver, Colo., 1500-lb. steam hammer; Terre Haute, Indianapolis & Eastern Traction Co., 300-ton wheel press.

The DuPlex Oil Heating Corporation, 263 West Thirty-fourth Street, New York, incorporated with \$1,000,000 capital stock, will manufacture oil burners and equipment. Part and whole installations will be made by contract, as well as materials required in setting up. Equipment necessary in the company's plant at Bayside, L. I., includes nickel-chrome steel castings, valves, brass fittings, etc. Dr. John E. De Mond is president; J. W. Newbery, vice-president and general manager; J. H. Myers, treasurer, and F. D. Robertson, engineer.

J. J. Spurr & Sons, Harrison, N. J., are in the market for a face plate for an engine lathe, 60 to 70 in. diameter with gear and pinion.

The entire block bounded by South Park, Van Cortlandt, Saxon and Dickinson Avenues, Bronx, New York, has been acquired by the Radio Corporation of America, Woolworth Building, as a site for a new plant, for which plans are said

to be in preparation. It will be equipped for the manufacture of wireless apparatus.

The Ideal Roller & Mfg. Co., Bush Terminal, foot of Forty-third Street, Brooklyn, plans the purchase of one or more heavy duty lathes, 18-in. swing.

Joseph Stolz & Son, Inc., Commerce Avenue, Highbridge, New York, machinery dealer, has inquiries out for a power boat, about 65 ft. long, with heavy duty gasoline engine, 75 hp., and auxiliary equipment.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a pumping plant to be constructed near Cairo, Egypt, for which bids will be received until March 31, the installation to include four internal-combustion engines, each direct-connected to a centrifugal pump, with capacity of about 100 cu. ft. per sec. Specifications on file at the New York district office, 734 Custom House, reference No. 120385; also a railroad company in North China, which is arranging a fund of about \$20,000,000 for extensions, to include additional locomotive and car repair shops, new machinery and machine shop equipment, as well as material-handling machinery, reference No. China 35x-c.

The National Chemical Co., 145 West Forty-first Street, New York, is reported to be in the market for a bench lathe.

The Pure Oil Co., 74 Broadway, New York, with headquarters in the Pure Oil Building, Columbus, Ohio, operating refineries and other oil properties, has disposed of a bond issue of \$15,000,000, a portion of the proceeds to be used for extensions.

Boris W. Dorfman, 26 Court Street, Brooklyn, architect, has plans under way for a one-story automobile service and repair building, 127 x 220 ft., at Montague and Forman Streets, for a company whose name will be announced later, estimated to cost \$100,000 including equipment.

The municipal council, Formiga, State of Minas Geraes, Brazil, has granted permission to Joao Josinho and Augusto Rocha, Formiga, to organize a company to construct and operate an electric generating plant for service at Porto Real, Arcos, and Pains. Plans will soon be arranged. M. A. Cremer, assistant trade commissioner, United States Bureau of Foreign and Domestic Commerce, Washington, stationed at Rio de Janeiro, Brazil, is familiar with the project.

The Dean-Murray Garage Co., 875 St. Nicholas Avenue, New York, George N. Willard, president, has filed plans for a four-story service and repair building and garage, 50 x 200 ft., at 619-21 West 152d Street, to cost \$100,000 with equipment. L. B. Mapes, 30 Church Street, is consulting engineer.

Ovens, oil-burning equipment, conveying and other machinery will be installed in the four-story addition to be erected at Eleventh Avenue and Fiftieth Street, New York, by the Horn & Hardart Co., 600 West Fiftieth Street, New York, totaling about 62,000 sq. ft., estimated to cost \$500,000. Later four additional stories will be added. F. P. Platt & Brother, 680 Fifth Avenue, are architects.

The Western Electric Co., 195 Broadway, New York, manufacturer of telephone equipment, etc., has leased space in the building at 111-19 West Nineteenth Street, extending through to 110-18 West Twentieth Street, for extensions in its local plants.

Otto Volkening, 1239 Madison Avenue, New York, will commence the erection of a two and one-half-story automobile service and repair building, 120 x 158 ft., on 167th Street, near Jumel Place, to cost about \$80,000. Moore & Landsiegel, Third Avenue and 148th Street, are architects.

The Combustion Utility Corporation, Brooklyn, an interest of Henry L. Doherty & Co., 60 Wall Street, New York, operating public utility properties, has disposed of its local factory at 413-19 Kent Avenue, corner South Eighth Street, previously used for the manufacture of combustion equipment to Flohr & Harris, 248 Lafayette Street, New York, manufacturers of oils, etc., who will occupy the plant. The selling company recently purchased factory property at Toledo, Ohio, heretofore held by the Willys-Knight Motor Co., and has removed its works to this location.

The Universal Car Sales & Service Corporation, 434 Jackson Avenue, Long Island City, has acquired property, 100 x 125 ft., on Jackson Avenue, for the erection of a new two-story service and repair building.

Fire, Feb. 19, destroyed a portion of the plant of the Armour Fertilizer Works, Inc., 209 West Jackson Boulevard, Chicago, at Carteret, N. J., with loss estimated at \$100,000.

The Crane Market

While companies with inquiries in the market manifest a strong inclination to delay purchase, in some cases because of insufficient or late appropriation, new inquiries continue to appear bringing the volume of prospective business in electric overhead and hand power cranes to fairly large proportions. Probably the outstanding list of cranes this week is the inquiry of Dwight P. Robinson & Co., 61 Broadway, New York, for 11 electric overhead traveling cranes for the Finley shops of the Southern Railway System. The list includes one 150-ton, 77-ft. 5-in. span, 3-motor, double trolley overhead crane; two 15-ton, 75-ft. 1-in. span; two 15-ton, 56-ft. 6-in. span; two 15-ton, 23-ft. 11½-in. span; one 20-ton, 60-ft. span; one 20-ton, 58-ft. 2½-in. span, and two 20-ton, 38-ft. 7½-in. span, all three motor, overhead traveling cranes.

Among prospective purchasers of locomotive cranes are the Bessemer & Lake Erie Railroad, Pittsburgh, which has been receiving quotations on a 25-ton locomotive crane and the Carnegie Steel Co., Pittsburgh, in the market for a 20-ton locomotive crane. H. S. Henry & Son, 116 Broad Street, New York, have asked for quotations on seven 5-ton locomotive cranes, meter gage, for export to Brazil. Award will probably be made in the next few days of the 10-ton and 20-ton special gantry cranes for Pier 6 of the West Shore Railroad. The Boston Elevated Railroad, Boston, which issued a list of cranes about six months ago and purchased one at the time is now negotiating for the purchase of two more cranes from this list. The Public Service Electric Co., Newark, N. J., will probably close shortly on the 50-ton overhead crane for which inquiry was recently issued. In addition to three cranes placed last week by the American Sheet & Tin Plate Co. for its Guernsey works, Cambridge, Ohio, that company will close in a few days for a 40-ton, 48-ft., 2-in. span overhead crane with 10-ton auxiliary for the Guernsey works and a 15-ton, 73-ft. span bar storage yard crane for its Mercer works, Farrell, Pa. The Westinghouse Electric

& Mfg. Co., Pittsburgh, has inquired for two 5-ton cranes for its East Pittsburgh works.

Among recent purchases are:

Morris Ice Co., Jackson, Miss., a 1-ton, 42-ft. 3-in. span, 3-motor, overhead crane from the Shepard Electric Crane & Hoist Co.

Metropolitan Ice Co., South Orange, N. J., a 1-ton, 35-ft. span hand power crane with electric hoist from the New Jersey Foundry & Machine Co.

New York Shipbuilding Co., Camden, N. J., seven 2-ton single I beam hoists from the Shepard Electric Crane & Hoist Co.

Cal Electric Light & Power Co., Call, Colombia, a 5-ton, 24-ft. single I beam crane from the Chisholm-Moore Mfg. Co.

Downington Mfg. Co., Downington, Pa., a 10-ton, 36-ft. span overhead traveling crane from an Eastern crane builder.

Oliver Iron Mining Co., Duluth, Minn., two 35-ton, 50-ft. boom locomotive cranes from the Industrial Works.

Erie Railroad, New York, a 40-ton used locomotive crane from Archer & Baldwin, Bergen, N. J.

Washington Iron Works, San Francisco, Cal., a 5-ton, 37-ft. span overhead traveling crane from an Eastern crane builder.

Flockhart Foundry Co., Newark, N. J., a 5-ton, 48-ft. span overhead traveling crane from the Pawling & Harnischfeger Co.

Ferracute Machine Co., Philadelphia, a 10-ton, 46-ft. span overhead traveling crane from an unnamed builder.

Haynes & Lemberger Mfg. Co., St. Louis, a 2-ton, 40-ft. span, double I beam crane from the Shepard Electric Crane & Hoist Co.

A. O. Smith Corporation, Milwaukee, a 2-ton hand power crane from the Whiting Corporation.

Nichols Wire & Sheet Co., Davenport, Iowa, a 3-ton hand power crane from the Whiting Corporation.

including buildings and equipment. No announcement has as yet been made regarding rebuilding.

The City Commission, Orange, N. J., is considering the installation of a new turbo-generator and auxiliary equipment at the municipal power plant, to cost about \$30,000, as recommended by Fred Luthy, chief engineer of the plant. George Roach, director of streets and public improvements is in charge.

The Union County Buick Co., 333 North Broad Street, Elizabeth, N. J., local representative for the Buick automobile, is taking bids for a two-story addition, 42 x 100 ft., to its service and repair building, estimated to cost \$45,000. Harold B. Brady, company address, is architect.

The Atlantic Coast Electric Light Co., Asbury Park, N. J., recently acquired by the Eastern New Jersey Power Co., is said to have plans in progress for extensions in its power plant and system to cost approximately \$375,000 including equipment.

Following the completion of a new unit, 65 x 320 ft., at its plant, the Ransome Concrete Machinery Co., Dunellen, N. J., has arranged to use the structure for plate and structural iron working, giving over the portion of the previous building used for this purpose for extensions in the machine shop and machine departments.

The Central Jersey Power & Light Co., Summit, N. J., has acquired the Tri-County Electric Co., Pompton Lakes, N. J., and vicinity. The new owner will consolidate the plant and system and plans for extensions in equipment.

The Illinois Glass Co., Bridgeton, N. J., has awarded a general contract to the J. S. Rogers Co., Drexel Building, Philadelphia, for a one-story addition to its plant, 100 x 450 ft., to cost approximately \$200,000, including equipment. A portion of the structure will be used for the manufacture of paper boxes, this department costing about \$75,000. Headquarters are at Alton, Ill.

Manual training equipment will be installed in the three-story high school to be erected at Linden, N. J., estimated to cost \$400,000, for which bids will be asked on a general contract early in March. A site has been selected on George Avenue. Harold B. Brady, 333 North Broad Street, Elizabeth, N. J., is architect.

The Newark Art Metal Bed Co., 31 Summer Avenue, Newark, has leased a three-story building at 314 Halsey Street, for extensions.

The Otto Bernz Co., Inc., 17-31 Ashland Street, Newark, manufacturer of plumbers' and other tools, is taking bids for a one- and two-story building to replace a structure recently destroyed by fire, with reported loss of \$100,000 including equipment. D. J. Scrocco, 185 Market Street, is architect.

Philadelphia

PHILADELPHIA, Feb. 25.

THE Heminway Co., 243 Elbow Lane, Philadelphia, paper products, has acquired the four-story factory, 37 x 106 ft., at 828-30 North Hancock Street, in the name of its president, Edward D. Heminway, for enlargement.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until March 4 for 45 crucibles for the Philadelphia Navy Yard, schedule 1916, and until March 11 for 2325 lb. aluminum alloy, schedule 1932.

The Publicker Commercial Alcohol Co., Swanson and Snyder Streets, Philadelphia, has plans for a new tank house, with steel tanks, pumping apparatus, etc.

Bids will soon be asked by the city engineering department, Philadelphia, for the construction of a new power house on Wheatshaf Lane, for municipal service, for which plans are being drawn.

Richard Miller, Hometown, Pa., is planning the construction of a saw mill and power house in the Locust Mountain section, near Hazleton, Pa.

Harry Wolfberry, Altoona, Pa., care of Rudolph & Kent, Masonic Building, architects, has had plans drawn for a two-story automobile service and repair building, 50 x 120 ft., to cost \$30,000 with equipment.

The Consumers' Cigar Box & Lumber Co., Red Lion, near York, Pa., has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss estimated at \$100,000 including machinery. Equipment in the proposed new mill will be electrically-operated.

Manual training equipment will be installed in the new high school to be erected at Bloomsburg, Pa., estimated to cost \$500,000, for which plans are being drawn by McLanahan & Bencker, Bellevue Court Building, Philadelphia, architects.

The Pennsylvania Railroad Co., Broad Street Station, Philadelphia, Pa., plans for the construction of a new engine house with repair department at Lock Haven, Pa., to replace a small structure now in use. A new steel coaling wharf, with mechanical-handling equipment, will also be built at this location, and other improvements made, with total cost placed at \$265,000. H. H. Russell is local superintendent. The company will install 14 traveling cranes in the locomotive erecting shop now being completed at the Altoona, Pa., works, varying up to 250 tons capacity, with other equipment to provide for the handling of 54 locomotives at one time.

Chalfant & Scott, Forty-seventh and Paschall Streets, Philadelphia, will build a new coal storage plant at Forty-ninth and Marion Streets, with loading and unloading equip-

ment, conveying apparatus and trestles. William Steele & Sons Co., 219 North Broad Street, is engineer and contractor.

J. F. Brown, Philadelphia, care of C. A. Mitchell, Lancaster Building, Philadelphia, has plans for a two-story automobile service and repair building at Arch and Thirty-second Streets, 145 x 200 ft., to cost \$200,000 with equipment.

G. A. Bisler, Inc., 245 North Sixth Street, Philadelphia, manufacturer of paper boxes and containers, has filed plans for a new four-story plant at Fifth and Brown Streets, 135 x 146 ft., to cost \$207,000 with machinery.

Fire, Feb. 19, destroyed a portion of the service and repair building of the Franklin-McKenna Motor Sales Co., 47 North Third Street, Camden, N. J., with loss estimated at \$100,000 including equipment. It is planned to rebuild. William C. McKenna is head.

Manual training equipment will be installed in the proposed two-story and basement high school to be erected at Pensauken, Merchantville, N. J., estimated to cost \$250,000. A. Moses, Temple Building, Camden, N. J., is architect. Bids will soon be asked on a general contract.

The Tattersall Co., 147 North Warren Street, Trenton, N. J., coal and building material dealer, has acquired property at Washington Heights, Pa., for a new coal storage plant, with loading and unloading equipment, conveying machinery, etc., estimated to cost \$80,000.

The Lackawanna Hardware Co., 339 Penn Avenue, Scranton, Pa., plans for the erection of a new two-story building, 50 x 85 ft., fronting on the line of the Central Railroad of New Jersey, to cost about \$25,000.

The Philbrin Corporation, Kennett Square, near West Chester, Pa., manufacturer of ignition equipment, etc., plans the immediate rebuilding of the portion of its plant destroyed by fire Feb. 18 with loss estimated at \$45,000 including equipment.

Ovens, power equipment, conveying and other machinery will be installed in the two-story baking plant to be erected at Seventeenth and Brookwood Streets, Harrisburg, Pa., by the American Stores Co., 424 North Nineteenth Street, Philadelphia, Lloyd Cross, in charge. It will be 75 x 180 ft., estimated to cost \$40,000.

The Erie Railroad Co., 50 Church Street, New York, plans the erection of a new machine shop at Avoca, Pa., with equipment installation to give employment to about 200 men. A storehouse will also be built.

A manual training department is planned in the proposed high school to be erected at Lewisburg, Pa., estimated to cost \$110,000. The Board of Education, Robert Thompson, president, is in charge.

The Old Lycoming Power & Light Co., Allentown, Pa., is being organized as a subsidiary of the Pennsylvania Power & Light Co., to install and operate a station and system for light and power service in Old Lycoming Township, Lycoming County. Thomas J. Perkins, Allentown, is representative.

Electrical pumping and other equipment will be required for the new garbage incinerator plant to be built at Allentown, Pa., on which bids will be asked some time in May. George E. Cavanaugh is in charge.

The Salvage & Reclamation Co., Spruce Street, Camden, N. J., is inquiring for a high-knife alligator shear, capacity approximately 2 in. sq., to be used in a scrap yard.

The Richard De Cou Co., Twelfth and Noble Streets, Philadelphia, structural shapes, will commence the erection of a new one-story fabricating shop.

Buffalo

BUFFALO, Feb. 25.

WORK will commence on a one-story addition to the plant of the Linde Air Products Co., 155 Chandler Street, Buffalo, manufacturer of industrial oxygen apparatus, to cost about \$25,000.

A special election has been called by the Council, Medina, N. Y., on March 18, to vote bonds for \$50,000 for waterworks extensions, including the construction of an electrically-operated pumping plant in the City Park section, Oak Orchard Creek.

Manual training equipment will be installed in the proposed high school to be erected on Main Street, Tonawanda, N. Y., for which a bond issue of \$650,000 is being arranged. The Board of Education is in charge.

The Bancroft-Jones Corporation, Bailey Avenue, Buffalo, manufacturer of fabricated steel industrial buildings, is said to be planning for the installation of additional equipment, including a radial drill for structural steel shapes.

Manual training equipment will be installed in the two-

story and basement high school to be erected at Solway, N. Y., estimated to cost \$400,000, for which bids are being asked on a general contract. M. L. King, Snow Building, Syracuse, N. Y., is architect.

The Syracuse Lighting Co., Syracuse, N. Y., a subsidiary of the United Gas Improvement Co., Broad and Arch Streets, Philadelphia, is arranging a fund of \$3,000,000 for the construction of a new gas generating plant, with coal-handling plant, etc.

Alfred S. Meldrum, 409 Niagara Street, Buffalo, local representative for Lincoln automobiles and Ford cars and trucks, has acquired property at 157-59 Niagara Street, and plans the construction of a one-story service and repair building, 50 x 160 ft. Permission has been asked from the city council to operate a day and night machine repair works. The present works will be removed to the new location and extended.

Manual training equipment will be installed in the two-story high school to be erected at Dolgeville, N. Y., estimated to cost \$225,000, for which bids will be asked on general contract about March 1. Tooker & Marsh, 101 Park Avenue, New York, are architects.

Electric power equipment will be installed in the proposed garbage disposal plant to be erected by the Board of Works, Buffalo, on the Abbott Road, South Buffalo, estimated to cost \$150,000. Commissioner Schwartz is in charge.

The General Shade Roller Corporation, Woolworth Building, Watertown, N. Y., has been incorporated with \$50,000 capital stock to manufacture metal shade rollers. Most of the work will be done in the company's plant, but some small parts and screw machine work will be done by contract. Punch presses, spring making machines and equipment for making tin rollers are needed at once. Will Orick is one of the principals.

H. M. Quackenbush, Herkimer, N. Y., has an inquiry out for a second-hand No. 3 Dayton swaging machine.

New England

BOSTON, Feb. 25.

FEBRUARY gives promise of an unprofitable month for machine-tool dealers, but New England machine tool builders find the situation less disappointing. Dealers are employed on a large number of prospects; to secure orders, however, is a difficult task. Buyers for one reason or another will not close on inquiries, possibly because they anticipate lower prices. Dealers, on the other hand, hold firmly to lists.

Going business is largely confined to used tools, average buyers being small shops and prices involved mostly under \$500.

The sale of a new 24 ft. x 16 in. Sydney lathe and a used 36 x 36 in. planer to a local shop, and two controllers for planers to the Boston & Maine Railroad are the most conspicuous exceptions in the new equipment market the past week. The Amoskeag Mfg. Co., Manchester, N. H., desires a six spindle bolt threading machine, and the Vermont Marble Co., Proctor, Vt., a two-ton electric crane.

The demand for small tools and machine parts has dropped sharply the past fortnight. Heretofore such business was the backbone of several local machine tool houses.

Genuine Stillson wrenches are 60 and 5 per cent discount, as against 60 per cent previously, a purely local market development. Otherwise prices for small tools used in machine shops are firm and tend upward. Manufacturers of files have advanced prices 10 per cent, the first price change made since September, 1922.

The Metropolitan Filling Stations, Inc., 80 Boylston Street, Boston, is in the market for a steel oil barge of between 100,000 and 300,000 gal. capacity.

The Diehl Mfg. Co., 566 Atlantic Avenue, Boston, will furnish the Arsenal, Watertown, Mass., with electric motors for loading mechanism.

Bids close March 1 for a proposed coal trestle to be erected by the Orford Soap Co., Hilliard Street, Manchester, Conn. Motors and lifting equipment are required.

The contract for a one-story addition to the machine shop and foundry at 25 Elm Street, New Bedford, Mass., has been awarded by Chester S. Hathaway. Plans are private.

A permit has been granted the Wamesit Power Co., 40 Middlesex Street, Lowell, Mass., to erect a four-story, 13 x 104 ft. addition to its plant on Crosby Street. Walter H. French is superintendent.

The New England Coal & Coke Co., Boston, has under consideration estimates of costs of revamping its entire coal handling equipment at the Everett, Mass., plant. Plans are in the initial stages.

The Wells Corporation, Greenfield, Mass., which recently acquired the American Tap & Die Co. and Nichols Brothers of that city, plans to install new equipment in the Nichols Brothers department with a view to increasing production.

Work has started on three sub-stations at 40 Court Street, Taunton, Mass. Francis P. Callahan, chairman municipal electric lighting commission, is in charge of the projects. Jackson & Moreland & Sons, Court Street, Taunton, are the engineers.

The E. A. Eddy Machinery Co., Providence, R. I., is in the market for a 17 Toledo power press or equivalent.

The Collier-Keyworth Co., Gardner, Mass., is inquiring for two used Stiles pattern Bliss presses, No. 1.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until March 11 for four electric annealing furnaces for the Fore River Station, Mass., and Camden, N. J., schedule 1914, and two electric melting furnaces, schedule 1921; also for 18 depth gages for the Portsmouth, N. H., Navy Yard, schedule 1935.

The Municipal Gas & Electric Department, Holyoke, Mass., is having plans drawn for extensions in the municipal electric power plant, including the installation of additional equipment. McClintock & Craig, 35 Lyman Street, Springfield, Mass., are engineers. John J. Kirkpatrick is manager.

The Springfield Foundry Co., Albany Street, Springfield, Mass., has filed plans for an addition to cost \$25,000, for which a general contract has been let to L. S. Wood, Springfield.

The New Method Die Co., 100 Sudbury Street, Boston, plans the installation of a punch press.

Superstructure work is under way on a power house at Fall River, Mass., for the Durfee Mills, Inc., manufacturer of textiles, estimated to cost \$50,000 with equipment. The Henry R. Kent Co., 10 Erie Avenue, Rutherford, N. J., is architect and engineer.

The Newport Carton Co., Newport, R. I., is closing negotiations with the Industrial Development Co., for the erection of a new plant on the Commercial Wharf for the manufacture of paper cartons and containers, estimated to cost \$25,000.

The Jannell Body Mfg. Co., Woonsocket, R. I., manufacturer of automobile bodies, will occupy a new one-story plant, 75 x 250 ft., to be erected by H. Bozoian, Woonsocket, on the Cumberland Hill Road. A list of equipment to be installed will soon be arranged.

St. Louis

ST. LOUIS, Feb. 25.

PROPERTY at Fifth Street and Cox Avenue, Joplin, Mo., 150 x 225 ft., has been acquired by the Shafer-Leverett Boiler & Machine Co., Joplin, as a site for a new plant, for which plans will soon be drawn. The company has acquired the local plant and business of the Gus James Boiler Works, and will merge with its organization. John L. Shafer is president.

The United States Army Department, Washington, has authorized the installation of oil-burning equipment at the power plant at the Jefferson Barracks, Mo.; also for the construction of a pumping plant at Fort Winfield Scott, Kan., and for alterations and improvements in the steam turbine generating plant at Fort Leavenworth, Kan. Plans will soon be drawn and bids asked by the constructing quartermaster.

The Coleman Lamp Co., Second Street, Wichita, Kan., has awarded a general contract to John M. Denny, 1451 North Lawrence Street, for a two-story and basement plant, 60 x 92 ft., estimated to cost \$60,000 including equipment.

The Common Council, Hartsville, Mo., has plans under advisement for a municipal electric power plant on the Gasconade River. The local Commercial Club is interested in the project.

The Allied Refining Co., Tulsa, Okla., is having plans drawn for an addition to its refinery at Okmulgee, Okla., to cost approximately \$130,000 with equipment. W. P. Henry, Okmulgee, is company engineer.

The Crystal Ice & Fuel Co., Independence, Kan., has awarded a general contract to the Brewster Brothers Con-

struction Co., Independence, for a new one-story ice and cold storage plant, 60 x 140 ft. Foundations will be arranged to provide for an addition of two more stories later. Hans Von Unwerth, Finance Building, Kansas City, Mo., is consulting engineer. A. B. Shaffer is general manager.

O. A. Sommer, 3704 Juniata Street, St. Louis, is at the head of a project to organize a local company to construct and operate an automobile service and repair works, to be five stories, 100 x 160 ft., estimated to cost \$190,000 with equipment.

The Nelson Canning Co., Ava, Mo., plans for the installation of additional equipment at its power house, including engine, boiler and auxiliary machinery. Roy Nelson is head.

The Rochester Last Works, 1220 University Avenue, Rochester, N. Y., has leased a building at 3417 Chouteau Avenue, St. Louis, and will remodel for the manufacture of iron shoe lasts, etc.

Manual training equipment will be installed in the three-story and basement junior high school to be erected at Thirty-first Street and Indiana Avenue, Kansas City, Mo., estimated to cost \$300,000, for which foundations will soon be laid. C. A. Smith, Finance Building, is architect; J. A. Brady, Library Building, is mechanical engineer.

The Kansas City Power & Light Co., Fourteenth Street and Grand Avenue, Kansas City, Mo., will soon commence the construction of a one-story and basement automatic power substation at Sixth and Penn Streets, 61 x 108 ft., to cost about \$47,000 with equipment.

The Eagle-Picher Lead Co., 208 South La Salle Street, Chicago, has acquired about 400 acres near Douthat, Okla., for \$80,000 and plans the development of a portion of the site, to include the installation of electric power and mining equipment.

Manual training equipment will be installed in the proposed high school to be erected at El Dorado, Ark., estimated to cost \$300,000, for which a bond issue is being arranged. The Board of Education is in charge.

The Columbia Cotton Oil Co., Magnolia, Ark., is planning to rebuild the portion of its cottonseed oil mill, recently destroyed by fire, with loss estimated at \$125,000 including equipment.

George S. Emery, P. O. Box 1727, Tulsa, Okla., and associates are interested in iron mine operations and are planning the installation of mining equipment involving several hundred thousand dollars. They are considering a bond issue for equipment and construction purposes, also water-power development for local power purposes.

Pittsburgh

PITTSBURGH, Feb. 25.

MACHINE tool business is better in promise than performance. Buyers are showing much caution about closing, and the past week saw only two awards of any considerable volume or money value. One was for the New Castle, Pa., plant of the Carnegie Steel Co., the order including two lathes, a boring mill, shaper, radial drill, knife grinder and a pipe threading machine, while the Blaw-Knox Co. bought six punches and a double angle shear. Inquiry for tools is good, but evidence of the lack of orders is found in the fact that builders in most centers are operating at a low rate, in some districts below 50 per cent of capacity. It is intimated that some builders are carrying many standard tools made up and stocked in the rush times of a few years ago.

Preliminary plans are under consideration by the Westinghouse Air Brake Co., Pittsburgh, for an addition to its plant in the Wilmerding section to cost \$1,000,000 with equipment. It will consist of a main one-story unit for foundry and machine shop service, the last noted portion to be given over primarily to the manufacture of automatic train control apparatus.

T. A. Penney, Pittsburgh, has filed plans for the erection of a one-story general machine shop at 2526 Charles Street, for which foundations will be laid at once.

The City Council, Grove City, Pa., has superstructure work under way on the proposed municipal electric power plant and will commence the installation of equipment at an early date.

The Mine Safety Appliance Co., 909 Chamber of Commerce Building, Pittsburgh, has awarded a general contract to West Brothers Co., Wilkinsburg, Pa., for a four-story plant at Braddock Avenue, Meade Street and the Thomas Boule-

ward, 63 x 145 ft., to cost \$140,000 with equipment. B. H. Prack, Keystone Building, is engineer. George B. Beike is president.

Fire, Feb. 19, destroyed a portion of the distributing plant of the Greenpoint Metallic Bed Co., 2004 Pike Street, Pittsburgh, with loss estimated at \$40,000. Headquarters are at 226 Franklin Street, Brooklyn, N. Y.

The Smith Pocahontas Coal Co., Caloric, W. Va., has tentative plans for the installation of additional electric power and mining equipment at its local properties. W. E. Griffith is general manager and superintendent.

The Warwick Coal Co., Warwick, W. Va., will construct and operate a coal tippie and ice breaker near Lock No. 7, Monongahela River, on which work will commence at once.

E. H. Morford & Co., Moore Building, Charleston, W. Va., has inquiries out for a hoisting engine, 8 x 10 in., three drums, with swinger attachment, boiler and auxiliary apparatus.

The Wheeling Traction Co., Wheeling, W. Va., will commence the construction of new car barns, with shop and sand house, on Third Street, Warwood, W. Va., to cost about \$55,000.

Louis Sitnek, an official of the Sitnek Fuel Co., Pennsylvania Building, Philadelphia, is organizing a company under West Virginia laws, to be known as the Sitnek Coal Mining Co., capitalized at \$500,000. It has acquired the Katherine mine and other properties of the Antler Coal Co. at Lumberport, W. Va., for \$200,000, and plans for expansion and the installation of electric power and mining machinery. Mr. Sitnek will be president of the new company, and Ralph L. Rankin, secretary and treasurer.

The J. E. Moss Iron Works, Wheeling, W. Va., has plans for extensions and improvements in the plant of the Riverside Bridge Co., recently acquired, together with other such company interests. A department will be developed for the production of ornamental iron, brass, bronze and kindred products, in addition to regular structural steel fabrication. The company is also planning for enlargements in its main office building at Chapline and Twenty-eighth Streets. The capital has been increased to \$1,500,000 to provide for the Riverside company acquisition and expansion. J. E. Moss is president, and F. G. Jolliffe, secretary.

The Three Forks Lumber Co., Elkins, W. Va., has inquiries out for a log-loader, logging cars and kindred equipment, with industrial locomotive, Shay or Climax type. G. H. Dornblazer is president.

The State Board of Control, Charleston, W. Va., James S. Lakin, president, will commence foundations for a three-story and basement industrial school for colored boys at Maggie, W. Va., 46 x 139 ft., to cost approximately \$100,000. Theodore T. Sansbury, Parkersburg, W. Va., is architect.

The Price-Cook Aluminum Co., Grove City, Pa., manufacturer of aluminum novelty wares, has acquired a new building at Tidioute, Pa., and will move its plant and office to that city April 1.

Manual training and vocational equipment will be installed in the new high school to be erected at Wheeling, W. Va., for which contract will be awarded within a week.

Detroit

DETROIT, Feb. 25.

THE Means Stamping Co., Saginaw, Mich., recently organized, is arranging for the establishment of a local plant to manufacture metal stampings for automobile and other service. The local Kiwanis Club is interested in the organization, of which R. P. Means is president.

The Christiansen Lumber Co., Alston, Mich., is planning for the purchase of a band saw, rip saw and other equipment for a local lumber mill.

The Clover Foundry Co., Eleventh and Clay Streets, Muskegon, Mich., has tentative plans for a one-story addition, 60 x 170 ft., estimated to cost \$35,000. E. N. Vanderwest, Montgomery Building, is architect. Charles S. Clover is president.

The Texas Co., 17 Battery Place, New York, will commence the construction of a new central oil storage and distributing plant at Detroit, with pumping station, tank department, etc., estimated to cost \$100,000 with equipment. A similar plant will be constructed at Grand Rapids, Mich., to cost approximately \$65,000. The McKelvey Construction Co., Hammond Building, Detroit, is the general contractor.

The Dunn Sulphite Paper Co., Port Huron, Mich., recently organized, has engaged Billingham & Cobb, Press Building, Kalamazoo, Mich., engineers, to prepare plans for a new local mill, estimated to cost \$260,000 with machinery. The company is capitalized with 10,000 shares of stock, no par value, and is headed by R. G. Lambrecht, Charles F. Clip-

pert and Charles F. Bornman, 680 Delaware Avenue, Detroit. Headquarters will be established in the last noted place.

Manual training equipment will be installed in the new senior and junior high school to be erected at Muskegon, Mich., estimated to cost \$700,000, for which bids will be asked on general contract in about 30 days. H. H. Turner, Michigan Trust Building, Grand Rapids, is architect; W. W. Bradfield, same address, is mechanical engineer.

The West Michigan Cold Storage Co., Grand Rapids, Mich., has preliminary plans for the construction of an eight-story cold storage plant, estimated to cost \$250,000 with equipment. It is proposed to commence work in the spring. W. J. Breen, vice-president of the Home State Bank, Grand Rapids, is president of the company.

The Ford Motor Co., Highland Park, Detroit, is having plans drawn for a one-story unit at its local plant, 270 x 1250 ft., for a spring and upset works. Albert Kahn, 1000 Marquette Building, is architect.

Manual training equipment will be installed in the two-story high and grade school to be erected at National Mine, Mich., estimated to cost \$175,000, for which plans are being prepared by Derrick & Hubbert, Menominee, Mich., architects.

Fire recently destroyed a portion of the plant of the Norris Nover Iron Co., Saginaw, Mich., with a loss of about \$25,000. It is planned to rebuild immediately.

Chicago

CHICAGO, Feb. 25.

GREATER activity on the part of industrial companies is the encouraging feature of the market. The P. B. Yates Machine Co., Beloit, Wis., has placed orders for two planers, one vertical milling machine, one No. 4 plain milling machine, one 3-ft. radial drill, two upright drilling machines, two hand-screw machines, two turret lathes, two thread milling machines and a special horizontal boring mill, involving a total outlay of nearly \$40,000. The National Plate Glass Co., which recently issued an inquiry for machine tools for its Ottawa, Ill., plant, has not yet purchased its equipment. The Hart-Parr Co., Charles City, Iowa, has bought about \$3,000 worth of sheet metal machinery. Fairbanks-Morse & Co. plan to rearrange machine work operations at their Beloit, Wis., plant, which will necessitate the purchase of new equipment.

The Chicago, Milwaukee & St. Paul, which recently issued an extensive list, published in this column, has closed for from \$25,000 to \$30,000 worth of used boiler-shop machinery, which it purchased on the Pacific Coast. The Atchison, Topeka & Santa Fe has added nine items to its extensive pending list. Miscellaneous orders taken by local dealers have been more numerous than for some time. One representative house reports booking four times as much business the past week as during the preceding two weeks.

Additions to Santa Fe List

(All Machines to be Belt-Driven)

- One 5-ft. American, or equivalent, full universal radial drill.
- Two bench drills.
- One 4-ft. American, or equivalent, plain radial drill.
- One 32-in. Cincinnati, or equivalent, single head shaper.
- One Warner & Swasey, or equivalent, 12-in. x 6-ft. brass turret lathe.
- One Underwood, or equivalent, portable locomotive cylinder boring bar, 4½ in. x 8 ft.
- One band saw, filing and setting machine.
- One 24-in. x 10-ft. American, or equivalent, heavy duty engine lathe.

The Terre Haute Malleable Iron Co., Terre Haute, Ind., has ordered two 42-in. x 60-in. tumbling barrels from the Whiting Corporation, Harvey, Ill.

The Zimmer Tool & Mfg. Co., Galesburg, Ill., formerly at 468 Depot Street, has moved to more commodious quarters in the William Mfg. Co. building on North Academy Street.

The Bates Expanded Steel Truss Co., 208 South LaSalle Street, Chicago, manufacturer of steel electric poles, has started excavation for a two-unit galvanizing plant just south of its present works at East Chicago, Ind. The building will be of concrete and brick, 100 x 250 ft., and will cost \$75,000.

Harry B. Hoover, formerly proprietor of the American Welding Works, Rockford, Ill., has opened another welding shop at 213 North Church Street, to be known as the H. B. Hoover Co. It will do general welding work, radiator work and general automobile repairing.

The Electric Storage Battery Co., manufacturer of Exide batteries, Philadelphia, has purchased 130,000 sq. ft. on Western Avenue, north of Forty-seventh Street, Chicago, as a site for a factory branch, depot and service station. The first unit will contain 100,000 sq. ft. of floor space and will cost \$250,000. The company's present Chicago plant is at Thirty-fifth Street and Shields Avenue.

The Chicago Equipment Co., manufacturer of restaurant kitchen equipment, 1228 South Western Avenue, Chicago, has leased the third floor at 2534 South Western Avenue, containing 13,400 sq. ft. of floor space.

The Western Shade Cloth Co., corner Twenty-second and Jefferson Streets, Chicago, is taking bids through Lockwood, Greene & Co., 38 South Dearborn Street, on a two-story reinforced concrete plant, 125 x 400 ft., at the present works location, to cost \$500,000.

The National Art Bronze Works, recently incorporated with \$5,000 capital stock to manufacture articles in brass, bronze and steel, mainly metal work connected with interior bank and theater fixtures, has leased a plant at 1934-36 West North Avenue, Chicago. Equipment has been purchased. Officers are: President, Raymond E. Watson; secretary, Henry A. Stromsen; treasurer, Harold Stromsen.

The Rite-Lite Co., recently incorporated, 220 South State Street, Chicago, will manufacture a headlight controller for dimming automobile headlights. For the present the company is having its product made under contract, but expects to purchase dies and tools for the manufacturing operations. Officers are Mat Kemper, president and treasurer, and William Derzbach, secretary.

A. T. McLeod, 820 First National Bank Building, Chicago, is in the market for a 150 ft. belt conveyor, stone crusher, compressor and 50-hp. boiler.

The Red River Power Co., Grand Forks, N. D., has plans for a new electric generating plant in the vicinity of Red Lake Falls, Minn., estimated to cost \$150,000. William Birmingham is engineer.

Manual training equipment will be installed in the two-story high school to be erected at Oakes, N. D., estimated to cost \$250,000, for which foundations will soon be laid. Bell & Kinports, Fawkes Building, Minneapolis, Minn., are architects.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has acquired the tractor manufacturing plant of the Emerson-Brantingham Co., at Minneapolis, Minn., for its motor truck division. Possession will be taken about April 1, in the meantime the selling company removing this branch of production to its works at Rockford, Ill. The International company will equip the property, which totals 150,000 sq. ft., for motor truck distributing, service and repair work for this district, with likelihood of using the property later as an assembling plant.

The Frank P. Bauer Marble Co., 2339 North Hoyne Street, Chicago, will commence the erection of a one-story plant, 60 x 125 ft., at Melrose and Kostner Streets, for marble cutting, polishing, finishing, etc., estimated to cost \$42,000 with equipment. William T. Hooper, 201 East Ontario Street, is architect.

M. T. Hoff, village clerk, Madison, Minn., has been authorized to purchase a 250 hp. boiler and auxiliary equipment for municipal plant service.

L. H. Whitman, city clerk, Primrose, Neb., will take bids until March 6 for equipment for a municipal waterworks, including a deep-well, motor-driven pumping unit with capacity of 75 gal. per min.; 50,000 gal. capacity steel tank on 60 ft. steel tower, and auxiliary apparatus.

The Omaha Steel Works, 4802 Leavenworth Avenue, Omaha, Neb., are planning to rebuild the portion of the plant recently destroyed by fire with loss estimated at \$70,000 including equipment. John W. Towle is president.

The Mount Vernon Car Mfg. Co., Mount Vernon, Ill., is having revised plans prepared for its one-story foundry, 200 x 260 ft., estimated to cost \$300,000 with equipment, for which a general contract recently was awarded to the Hughes-Foulkrod Co., Oliver Building, Pittsburgh. Neiler, Rich & Co., 431 South Dearborn Street, Chicago, are architects and mechanical engineers.

The Wellman-Seaver-Morgan Co., Cleveland, reports net earnings of about \$8,000 during 1923. The company regards this as a favorable showing in view of the poor volume of business during the first half of the year. On Jan. 1, 1924, the company had orders amounting to \$2,000,000 on its books. At present it is operating its Cleveland plant at capacity and its Akron, Ohio, plant at 50 per cent of capacity.

Milwaukee

MILWAUKEE, Feb. 25.

ACTIVITY in the metal trades is increasing consistently, furnishing substantial hopes of a broadening of demand. Round lot business remains absent, but it is noticeable that buying is getting beyond the replacement stage. Used machinery is in relatively good request, the supply being such that most of the new concerns which are establishing shops are able to obtain practically all needed equipment from dealers' stocks. Among the larger industries, purchases usually are confined to single items. Builders of tools report current business only fair, but they are maintaining operating forces at a slightly higher level than before the holidays.

The Pawling & Harnischfeger Co., Milwaukee, manufacturer of electric traveling cranes, drilling, boring and milling machines, etc., has purchased from the receiver the entire property of the Hercules Steel Casting Co., Milwaukee, and after making some changes and otherwise renovating the works, will resume the operation as a unit of its plant about April 15 or May 1. The Hercules property is at 871-881 Robinson Avenue, and consists of a main shop, 60 x 260 ft., pattern shop and vault, warehouse and office buildings, and 2½ acres. The management and operating organization for the new unit is now being formed. Arthur G. Henricks is vice-president and general manager.

The Racine Mfg. Co., Racine, Wis., manufacturer of metal automobile bodies, will do some additional tooling for the purposes of a new department which will build steel-hulled motor-boats. It is unofficially stated that this production will be on account of the Dodge Brothers Motor Car Co., Detroit, and the power units for the craft will be regulation Dodge engines. Charles F. Barndt is vice-president and general manager of the Racine company.

The Mitchell Motor Car Co. of Racine, Wis., is being organized by a number of former executives of the bankrupt Mitchell Motors Co., Inc., who have acquired considerable machinery, raw and finished materials, designs and patent rights, and in addition to supplying replacement parts for the trade, expects to resume the production of Mitchell automobiles in Racine. Manufacturing and warehouse space has been leased elsewhere, the Mitchell real estate and buildings having been sold to the Nash Motors Co. Kenosha, Wis., which will take possession March 1. L. H. Bridgman will be president of the new Mitchell company, and Dallas E. Winslow, formerly of Detroit, secretary and sales manager.

The Bower City Stamping Co., Janesville, Wis., recently incorporated with an initial capital of \$10,000, has leased manufacturing space, pending the erection of a shop building, and is purchasing some new and used equipment, intending to get into production March 15 on an auto monogram and perforating device, a sanitary milk pail, and other dairy equipment, all protected by patents issued to Carl O. Johnson, 1419 Clark Street, who will be works manager. He formerly operated a sheet metal shop at Jefferson, Wis. August Bergholz, Jefferson, is president; Roy M. Cummings, Janesville, vice-president and secretary, and Robert Conway, Janesville, treasurer.

The Standard Piston Pin Co., Hamilton Avenue, Racine, Wis., is doing some replacement tooling as the result of heavy water damage during a fire on the night of Feb. 9 in its two-story frame shop. Machinery and stock were damaged \$6,500.

The Midwest Ventilating Works, Milwaukee, is a new \$6,000 corporation organized by Roland J. Murr, district manager Midwest Steel & Supply Co., 216 West Water Street, and Lee W. Cahill and Elmer A. Nachsheim, connected with local heating and ventilating concerns, to engage in the manufacture and installation of industrial ventilating systems. A shop will be established in leased quarters at once.

The Peck-Foster Motor Co., Superior, Wis., has engaged Roland C. Buck, Inc., local architect, to design a three-story, sales and service building, 100 x 140 ft., estimated to cost \$100,000. Work is to begin April 15. New equipment will be purchased for the machine and repair shop, which will have an area of 7000 sq. ft.

The Board of Trustees, village of Kohler, Wis., Sheboygan County, is asking bids until March 17 for furnishing and erecting a 100,000-gal. steel tank, mounted on a 100 ft. steel tower, for the municipal waterworks system. Jerry Donohue, Sheboygan, Wis., is consulting engineer.

Berlin & Swern, architects and engineers, 19 South LaSalle Street, Chicago, are working on plans for a \$300,000 improvement in St. Catherine's Hospital at Kenosha, Wis., embracing a new power plant and service building, three stories, 100 x 120 ft. The project is expected to mature about April 1.

The Tobin-Sutton Co., Ford dealer, 636-640 Lincoln Avenue, Milwaukee, will build a two-story sales and service

building, 68 x 182 ft., at Eighth and Windlake Avenues. Plans are being prepared by C. H. Tharinger & Bruecker, architects, 496 Cramer Street, and will be ready about March 10.

The Wausau, Wis., Board of Education accepted the bid of Fred W. Krause, local contractor, for erecting a two-story addition, 53 x 190 and 43 x 30 ft., to the Central High School, at \$102,584. The total cost is estimated at \$300,000. The extensions will be used mainly for vocational training classrooms and shops. The architects are Oppenhamer & Obel, Green Bay and Wausau. S. B. Tobey is superintendent of schools.

The Dunning Heating Supply Co., 131 Reed Street, Milwaukee, will invest approximately \$100,000 in a new manufacturing and warehouse building and machinery and other equipment for the production of steam power plant, heating and ventilating materials, supplies and accessories. A 2½-acre site at Fortieth Avenue and Mitchell Street, adjacent to the Northwestern and Milwaukee road lines, has been purchased. Plans for the new group are being completed and bids for the construction will be taken about March 15.

The Belle City Malleable Iron Co., Racine, Wis., has placed in operation the first unit of its new foundry, and will begin work early in the spring on the second unit of equal size. An annealing building was completed last fall. The working force has been increased to 500, and when the improvement is finished about Aug. 1, the number will be enlarged to 700 or 750. The plant replacement project involves an investment of about \$800,000 in buildings and equipment. The present facilities are being kept busy at capacity by automotive and railroad casting orders and contracts.

The Rhinelander, Wis., Board of Education will close bids March 3 for the erection of a new junior high and vocational school, designed by Smith, Reynolds & Brandt, architects, Manitowoc, Wis., and estimated to cost \$290,000.

The North Side Garage, Inc., 1316 North Thirteenth Street, Sheboygan, Wis., has plans by E. A. Stubenrauch, local architect, for a two-story and basement garage and service shop addition, 34 x 146 ft., costing about \$28,000. Fred H. Poethig is president.

The Ben Sadoff Iron & Metal Co., Fond du Lac, Wis., is enlarging its warehouse and adding a small list of machinery for the establishment of a new department for disassembling used automobiles and motor trucks, stocking parts, and re-manufacturing vehicles.

The Simms Foundry Corporation, Racine, Wis., reported at the annual meeting of stockholders that its entire capacity for manufacturing hot air furnaces has been absorbed for 1924, and deliveries averaging one carload a day will be required to fill orders until Dec. 31. It is likely that further additions to the plant will be made in the spring, as new orders are still being booked in heavy volume.

Cleveland

CLEVELAND, Feb. 25.

THE machine tool market, which has been slow all the month, shows a little improvement, although this is noticeable in inquiries rather than orders. Some manufacturers report a good increase in inquiries and consequently expect March sales to be better than February. The Canadian National Railways have issued a list on which three turret lathes are being figured on by a Cleveland manufacturer, as well as three turret lathes on the Southern Railway list. The New York Central Railroad still has some equipment pending. The Osgood Mfg. Co., Marion, Ohio, has purchased a 2500-ft. steam hammer for its new forge shop and it is reported to have purchased a 10-ton crane. The McNeil Boiler Co., Akron, Ohio, is inquiring for a 10-ft. used boring mill. A large amount of used machinery is being offered.

Crane builders report a good volume of scattered inquiries for electric traveling cranes and report the outlook very promising.

The Warren Foundry Co., Warren, Ohio, incorporated with a capital stock of \$150,000, has purchased the plant of the Warren Metallic Bed Co. and will remodel it for foundry purposes and add new buildings as required. It will specialize in the manufacture of piston rings and other light castings for automobiles. F. B. Whitlock, who resigned last July as president and manager of the Interstate Foundry Co., Cleveland, will be president-treasurer of the new company, and Edward W. Beech, formerly president and manager of the Ferro Machine & Foundry Co., Cleveland, will be vice-president and manager. Both have long been prominent in the foundry industry in the Central West. Edwin T. Ward,

formerly manager of the General Malleable Co., Warren, will be associated with the new company.

The McCauley Storage Battery Co., Cleveland, will build a new plant at Perkins Avenue and East Thirty-second Street. It will be a two-story building, 35 x 128 ft.

The Ohio Stove & Mfg. Co., Columbus, Ohio, plans the erection of two one-story factory buildings.

The Flixit Body & Fender Repair Co., East Sixty-fifth Street and Carnegie Avenue, Cleveland, will build a two-story addition with 12,000 sq. ft. of floor space. Earnest McGeorge, 3020 Euclid Avenue, is the architect.

The Ohio Wesleyan University, Delaware, Ohio, is having preliminary plans prepared for a chemistry building, the estimated cost of which is \$250,000. The H. K. Ferguson Co., Cleveland, is the architect.

The Motor Repair & Mfg. Co., 1549 Hamilton Avenue, Cleveland, has taken bids for a \$25,000 factory extension. It will include a one-story 60 x 100 ft. addition to its present plant and a two-story building, 60 x 20 ft.

The Acklin Stamping Co., Dorr Street, Toledo, Ohio, has awarded contracts for the erection of a new plant at Nebraska Avenue and the New York Central Railroad tracks, that city. The new factory, to cost \$250,000, will be 150 x 600 ft. Traveling cranes, conveyors and other equipment will be bought. The company is headed by Grafton M. Acklin, formerly with the Toledo Machine & Tool Co., and associated with him are his three sons, James M., W. Collord and Donard R.

The Central Metal Products Co., Canton, Ohio, manufacturer of hollow steel doors, interior trim, etc., is in the market for considerable new equipment.

The Timken Roller Bearing Co., Canton, has awarded contract to the Mebourne Brothers Construction Co. for the erection of a one-story brick and steel addition to its factory, 230 x 340 ft., to cost \$75,000 exclusive of machinery.

The Department of Public Service, W. Jackson, director, Toledo, Ohio, will take bids at once for a three-story municipal automobile service and repair building on Erie Street, for city motor trucks and cars, 100 x 145 ft., to cost \$150,000 with equipment. Langdon, Hohly & Gram, Nicholas Building, are architects.

Cincinnati

CINCINNATI, Feb. 25.

WHILE some manufacturers of machine tools report an improvement the past week, others state there was little change from that of the previous week. On the whole, however, the industry is holding its own and prospects look better. Most of the large orders placed are for special machines, but the regular lines are not being neglected. Lathe manufacturers report business fairly good, with the number of inquiries increasing. Radial drilling machines and milling machines are also in fair demand, the number of single orders coming through being better than early in the month. Planer manufacturers state orders are good, while manufacturers of small tools and portable electric tools say conditions are brighter.

Railroad buying is expected to stimulate demand from other sources, and the railroads themselves are expected to be heavy purchasers this year. The Louisville & Nashville and the Chesapeake & Ohio are expected to issue lists within the next 10 days. Used machinery continues in good demand.

The Buckeye Steel Castings Co., Columbus, Ohio, has awarded contract for an addition to its foundry and core-making departments. Considerable new equipment will be installed. S. P. Bush is president.

The Atlantic Ice & Cold Storage Co., Chattanooga, Tenn., which is completing an \$80,000 addition, will soon install about \$10,000 worth of additional ice and cold storage equipment for further expansion in the spring.

The Hardwick Stove Co., Cleveland, Tenn., has awarded contract to the Austin Co. for a one-story, 80 x 230 ft., brick and steel foundry. New equipment will be installed.

Fire, Feb. 18, destroyed a portion of the plant of the Delphos Mfg. Co., Delphos, Ohio, with a loss of \$50,000. The company manufactures sheet metal articles and tin receptacles. It is planned to rebuild.

Electrical pumping and incinerating machinery will be required for the new garbage disposal plant to be erected

at Findlay, Ohio, and for which the City Council is in charge.

Electrical, mechanical handling and other equipment will be required for new garbage incinerating plant to be erected at Nashville, Tenn., for which Hilary E. Howse, mayor, is in charge.

The City Council, Tompkinsville, Ky., is planning for an addition to its water supply system, which will include the construction of a 50 ft. dam in Mill Creek and the installation of pumping and auxiliary equipment.

Contract has been awarded to R. E. Mason, West Point, Ky., for a \$37,000 filtration and pumping plant at Elizabethtown, Ky., for which electrical pumping and auxiliary equipment will be required.

Manual training and vocational equipment will be installed in the two new schools to be erected at Lebanon, Tenn., for which the Board of Education is in charge.

The water, gas and light plants at Central City, Ky., owned by Shelby Gish, have been acquired by the Cincinnati Utilities Co., Cincinnati, for \$125,000. The new owner will make improvements throughout.

Electrical pumping and other equipment will be installed in connection with improvements to be made to the municipal waterworks at Berkley, Ohio, estimated to cost \$260,000 and for which Russell A. Murdock, village engineer, is in charge.

The Merkel Brothers Co., Cincinnati, manufacturer and wholesale distributor of plumbing and heating supplies, has awarded contract to the Austin Co., Cleveland, for a complete new plant consisting of a mill building, three stories, 100 x 320 ft.; pipe building, two stories, 100 x 220 ft.; garage, boiler room, coal storage and all mechanical equipment, including railroad track installation. The project is to cost \$500,000.

The Davis Welding & Mfg. Co., 1110 Richmond Street, Cincinnati, is having plans prepared by Lockwood, Greene & Co., 38 South Dearborn Street, Chicago, architects and engineers, for a new plant in the Evoydale section, estimated to cost \$100,000 with equipment.

The Tennessee Paper Mills, Inc. Chattanooga, Tenn., plans for extensions to increase the output from 50 to 60 tons per day, primarily paper box stock. Work is in progress on a new power house to be equipped to burn pulverized coal, with two 500-kw. direct-connected generators, estimated to cost \$80,000. John Stagmaier is president.

The Mississippi River Commission, 1000 McCall Building, Memphis, Tenn., will take bids until March 14 for one horizontal boiler and one vertical boiler feed pump, circular 24-33; also for one centrifugal sand pump and engine, circular 24-34.

The General Match Co., Cincinnati, has awarded a general contract to Hodges, Erwin & Co., Blymer Building, for its one and two-story plant, 204 x 225 ft., at Reading, Ohio, including power house, estimated to cost \$250,000 with machinery. The H. K. Ferguson Co., Euclid Avenue, Cleveland, is engineer.

The Christie Cut Stone Co., 2082 Elzey Avenue, Memphis, Tenn., recently formed with a capital of \$60,000, will commence the erection of a new plant, 60 x 100 ft., for which a general contract has been awarded to W. T. Hudson for stone-cutting, grinding, polishing, etc. Alexander Christie is president, L. C. Stephens is secretary-treasurer and consulting engineer.

Indiana

INDIANAPOLIS, Feb. 25.

PERMIT has been issued for a one-story addition to the plant of the Insley Mfg. Co., Olney Avenue and St. Clair Street, Indianapolis, manufacturer of excavating machinery, to cost \$43,000. It will be equipped for the production of a new type of gasoline-operated shovel recently perfected by the company and is expected to be ready for occupancy early in April.

The Board of School Commissioners, Indianapolis, Richard O. Johnson, 150 North Meridian Street, business director, is completing plans for a three-story and basement addition to the Emerich's manual training high school, Madison Avenue and South Street, to cost \$400,000, for which bids will soon be asked on a general contract. Adolph Scherrer, Indiana Trust Building, is architect.

The National Fireproofing Co., Fulton Building, Pittsburgh, has preliminary plans for rebuilding the portion of its plant at Hobart, Ind., recently destroyed by fire with loss of \$75,000 including equipment.

The Elam Paper Co., Marion, Ind., has abandoned plans for the proposed removal of its plant at Dayton, Ohio, and will concentrate operations at its present location. It has acquired a building at Second and Nebraska Streets and will remove the existing works from Third and Nebraska Streets,

providing additional equipment for increased production. S. L. Elam is president and general manager and W. H. Willy, secretary.

The Haywood Motor Sales Co., Bloomfield, Ind., plans for the erection of a one and two-story automobile service and repair building, 100 x 140 ft., to cost about \$50,000 with equipment.

The Showers Brothers Co., Bloomington, Ind., manufacturer of furniture, has awarded a general contract to the Ferguson Construction Co., Cleveland, for an addition to its plant No. 4, 150 x 160 ft., for the manufacture of refrigerators. It will cost \$130,000 with machinery. Plans are also in progress for a steam-operated central power plant, to cost approximately \$500,000 with equipment, and for a new chair factory and other structures, involving in all about \$1,000,000.

The Stigelmeyer Mfg. Co., Seymour, Ind., has purchased a controlling interest in the Simplex Train Control Co., Buffalo, and will transfer manufacturing operations to Seymour. The local plant will be arranged for a department to manufacture railroad control devices.

The Armstrong-Landon Co., Kokomo, Ind., hardware specialties, implements, etc., is planning for the construction of a six-story and basement storage and distributing plant, 66 x 133 ft., to cost \$225,000 with equipment. It will replace a smaller structure recently destroyed by fire.

Electrical pumping and other machinery will be required for the addition and other improvements to be made at the municipal pumping plant, Terre Haute, Ind., for which the Common Council is in charge.

Manual training and vocational equipment, motor driven, will be installed in the new school to be erected at Evansville, Ind., by the students taking construction course. The building will be two stories, 30 x 68 ft.

The North Judson Car & Equipment Co., headed by Albert M. Oliver, Oak Park, Ill., has purchased 90 acres at LaPorte, Ind., and plan the erection of a plant to manufacture and repair freight cars.

South Atlantic States

BALTIMORE, Feb. 25.

THE general purchasing officer, Panama Canal, Washington, will receive bids until March 6 for 12,600 ft. steel wire; 2800 hacksaw blades; 36 drills; 500 lb. seizing wire; 6000 ft. plow steel hoisting rope; 29,000 ft. plow steel rope; machine bolts, nuts, rivets and kindred material, circular 2348; until March 13 for pumps, fire brick, helical springs, wire lath, cable clips, chain, shackles, resistance wire, and similar apparatus, circular 1592; and until March 19 for three 1000-yd. capacity each steel dump scows, circular 1591.

The Central of Georgia Public Service Co., Macon, Ga., recently organized as a subsidiary of the Central Georgia Power Co., Macon, has acquired 22 acres near the city as a site for a new steam-operated electric generating plant. It will consist of five units, each with capacity of 13,000 hp., of which the first is expected to be ready for operation late in the fall. It will cost approximately \$2,000,000 with equipment. The plant will be operated by the parent company, which will construct a new automatic substation near the city limits and make other extensions for the additional power supply to cost about \$300,000. L. A. Magraw is general manager.

The Hec Mfg. Co., 1205 Fourth National Bank Building, Atlanta, Ga., manufacturer of mechanical equipment, is planning for extensions, to include the installation of drilling, shearing, punching and other metal-working equipment; bending apparatus, and electroplating equipment. The company is being reorganized with increased capital.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until March 4 for one seam welding machine for the Norfolk Navy Yard, schedule 1934; until March 11 for eight trunnion thrust bearings and eight trunnion roller bearings for the Washington yard, schedule 1929, and until March 18 for a quantity of mixed nuts for Eastern and Western yards, schedule 1930.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for one 300 kw. and one 500 kw. generator, 30 and 60 cycles, respectively, with auxiliary equipment; also for one heavy duty type Corliss engine, about 200 to 250 hp.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a company at Cartagena, Colombia, in the market for cement manufacturing machinery and equipment, reference No. 9198; of a company at Rio de Janeiro, Brazil, desirous of purchasing machinery for the manufacture of pins, hairpins, paper clips, etc., as well as hard rubber specialties, reference No. 9156; a company at Quebec, Canada, desirous of purchasing distilling machinery for wood alcohol production, reference No. 9200; a company at Puerto Cortes, Honduras, in the market for 15 tons of copper

wire for electric transmission service, and other wire and fittings, reference No. 9173, and a company at Johannesburg, South Africa, desirous of purchasing agricultural machinery and implements, reference No. 9189.

The office of the chief of engineers, United States Army, Washington, will receive bids until March 7 for one steam locomotive, circular 24-126.

Manual training equipment will be installed in the two-story high school to be erected at Cumberland, Md., estimated to cost \$175,000, for which bids will be asked on general contract in the near future by Smith & May, Calvert Building, Baltimore, architects.

The Chero-Cola Bottling Co., Coeburn, Va., has inquiries out for ice-making machinery for installation at its proposed local plant. The company was organized recently. T. B. Hillman is general manager.

The Central Metal & Supply Co., 609 East Lombard Street, Baltimore, has plans for a four-story storage and distributing plant, 80 x 110 ft., at Mace and Twentieth Streets, to include the installation of elevating, conveying and other material-handling equipment, estimated to cost \$190,000.

Fire, Feb. 14, destroyed a portion of the plant of the Henderson Cotton Oil Mill, Henderson, N. C., with loss estimated at \$200,000 including machinery. It is planned to rebuild.

The Board of Directors, State College of Agriculture and Engineering, Greenville, S. C., has tentative plans for a new steam power plant at the institution, with capacity of about 1000 hp.

The Taylor-Parker Co., Water Street and Commercial Place, Norfolk, Va., has inquiries out for one stiff-leg derrick, 5 to 10 tons capacity, motor-driven, with one $\frac{3}{4}$ to 1-ton capacity clamshell bucket, for quarry service; also for one 4-side woodworking planer, medium speed.

The City Council, Baltimore, has preliminary plans for a municipal steam power and heating plant, to cost approximately \$250,000 with machinery. W. F. Stone, Jr., Munsey Building, is architect.

The Town Council, Wise, Va., plans the installation of electrically-operated pumping machinery at the proposed waterworks plant, estimated to cost \$135,000, for which bonds will soon be voted.

The Common Council, Walnut Cove, N. C., will commence the construction of its proposed municipal electric power plant, to cost close to \$90,000. Contracts for machinery will soon be let. H. R. McPherson is city clerk.

The Continental Plant Co., Kirtell, N. C., has authorized the construction of a one and two-story woodworking mill, 75 x 150 ft., to replace its plant recently destroyed by fire with loss of about \$55,000.

The Crystal Springs Bleachery Co., Chickamauga, Ga., has inquiries out for equipment for the manufacture of paper bags and containers.

Manual training equipment will be installed in the boys' high school to be erected at Sumter, S. C., estimated to cost \$175,000, for which bids will be received on a general contract until March 11. Wilson, Berryman & Kennedy, Columbia, S. C., are architects.

Electrical pumping and other equipment will be required for new waterworks to be constructed at Jefferson, N. C., estimated to cost \$25,000, and of which Mayor H. C. Tucker is in charge.

Pacific Coast

SAN FRANCISCO, Feb. 20.

PLANS are being perfected by the New Metal Products Co., San Francisco, recently organized by Howard Spreckels, San Francisco, and associates, for the erection of a new plant at Oakland, Cal., to manufacture range boilers and other sheet metal products, estimated to cost \$80,000 with equipment.

The American Liquid Meter Co., Alhambra, Cal., lately formed by C. H. Warner, San Gabriel, Cal., and associates, will commence work on the first unit of its plant on 3-acre tract at 2217 Orange Street, recently purchased. It will be 60 x 140 ft., equipped for the production of liquid measuring devices for automotive service.

The Pacific Portland Cement Co., Pacific Building, San Francisco, has plans nearing completion for new works at Redwood City, Cal., with power plant, estimated to cost \$1,000,000 with machinery. Contract for foundations has been awarded to the Foundation Co., Holbrook Building. W. C. Stevenson, Pacific Building, is company engineer.

The Northwest Linseed Oil Co., Portland, Ore., has broken ground for a new mill, estimated to cost \$90,000 including machinery.

The General Electric Co., Schenectady, N. Y., with Los

Angeles offices at 724 South Spring Street, is reported to be concluding arrangements for the purchase of land near Alamitos Bay, Long Beach, as a site for a manufacturing plant.

The Globe Register Co., Cincinnati, manufacturer of business registers and systems, has acquired property on Horton Street, Oakland, Cal., for a new plant for Pacific Coast trade, to cost \$75,000 including machinery.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until March 11 for two whip hoists for the Puget Sound Navy Yard, schedule 1919; also for 2600 condenser tubes for the Mare Island Navy Yard, schedule 1920.

The Belcher Airplane Co., Watts, Cal., has acquired a portion of the Ramsauer tract of land as a site for a new plant. The main unit will be three stories, 200 x 400 ft., supplemented with auxiliary one-story structures, estimated to cost \$150,000 with machinery. A group of hangars will also be built to cost approximately \$100,000.

The Puget Sound Pulp & Paper Co., Seattle, has tentative plans under advisement for the construction of a new pulp and paper mill and automatic power substation on site near the city, estimated to cost \$5,000,000 with equipment.

The Riverside Cement & Asbestos Co., Riverside, Cal., will soon commence the construction of a new plant in the Eden Hot Spring district, estimated to cost \$500,000 with equipment. A power house will be built. The company also purposes to erect auxiliary works for the manufacture of wall board, shingles, tile and kindred products, using the output of its asbestos properties near Globe, Ariz. Amos Jones is superintendent.

F. J. Hurley, 365 Twenty-eighth Street, Oakland, Cal., will commence the construction of a one and two-story automobile service and repair plant at Webster and Twentieth Streets, to cost \$112,000 with equipment.

Gulf States

BIRMINGHAM, Feb. 25.

BIDS will be received by the United States Engineer Office, Montgomery, Ala., until March 3 for two upright boilers, submerged tube, circular 24-4628.

The Lehigh Portland Cement Co., Allentown, Pa., has expansion under way at its mill at Birmingham, to include the installation of a new kiln and equipment in other departments to increase the present capacity about one-third, making a total annual output of about 1,500,000 bbl.

The Sandow Lignite Co., Rockdale, Tex., recently organized, has acquired the plant and properties of the Federal Fuel Co., about six miles from the city. Plans are under consideration for extensive development, with installation of electric power and other equipment. A. P. Rudowsky is president, and John Weed, superintendent.

The United States Engineer Office, Florence, Ala., will take bids until March 22, for four electric generators, each 32,500 kva. capacity, with exciters and auxiliary equipment.

The International Great Northern Railroad Co., San Antonio, Tex., has plans for the construction of an engine house, with repair shop, to cost \$100,000 with equipment. F. S. Schwinn, Houston, Tex., is chief engineer.

The Dallas Power & Light Co., Dallas, Tex., has work under way on a new two-story automatic substation at North Dallas, to cost \$100,000, with machinery. The installation of equipment will soon be commenced.

The New Orleans Public Service Co., New Orleans, is arranging for a stock issue of \$7,000,000, a large part of the proceeds to be used in connection with an extension program for the present year, involving close to \$5,000,000, for construction and equipment.

G. E. Morris, Sweetwater, Tex., will commence the erection of a two-story automobile service and repair building, 92 x 100 ft., estimated to cost \$55,000, including equipment.

Roy B. Jones and P. F. Gwynn, Wichita Falls, Tex., are organizing a company with capital of \$500,000 to construct and operate a pipe line, with series of pumping plants, from the Archer County oilfields to Wichita Falls, about twenty-five miles. It is estimated to cost \$100,000 with machinery.

J. K. Cain, Corpus Christi, Tex., has plans for a new cotton compressing plant at San Juan, Tex., 140 x 200 ft., estimated to cost \$50,000, with equipment. It will be operated in the name of the Aransas Co.

S. P. Griffin, town clerk, Madison, Fla., will soon take bids for a municipal ice-manufacturing plant, to be operated in conjunction with the present municipal power plant. H. D. Oxford is chairman of the Street Committee, in charge.

The Common Council, Collinsville, Tex., has tentative plans for the installation of a municipal electric power plant. A bond issue is being arranged.

The Board of Supervisors, Louisiana State University, Pineville, has approved an appropriation of \$50,000 for the construction of a building to house a model sugar mill. The machinery installation is estimated to cost about \$175,000 additional, and will be arranged later in a separate appropriation.

W. B. Williams, city manager, Sanford, Fla., will receive bids until March 10 for electric-operated pumping machinery, deep well pumps, 200,000 gal. steel water tank on tower and other equipment for a proposed municipal waterworks, as per plans on file. Joseph E. Craig, 427 King Street, Jacksonville, Fla., is engineer.

The Merrimac Mfg. Co., Huntsville, Ala., operating textile mills has preliminary plans under way for additions to plants. New machinery will be required, including power house equipment.

The Anniston Foundry Co., Anniston, Ala., has awarded a general contract to the Ogletree Construction Co., Anniston, for the erection of three new buildings, 25 x 275 ft., 30 x 90 ft. and 40 x 62 ft., to replace the portion of the works recently destroyed by fire. Additional equipment will be installed. William H. Deyo is secretary and general manager. The company specializes in the production of cast iron soil pipe and fittings.

The United States Export Chemical Co., Tampa, Fla., will commence the construction of its proposed local plant for the production of high phosphate fertilizer products, to include a main operating unit with power house and auxiliary structures, estimated to cost \$1,200,000 including machinery. The company has a tract of 4000 acres of phosphate lands in this district, and will install equipment for development. The Chemical Construction Co., Charlotte, N. C., Peter S. Gilchrist, president, will be in charge of erection. Mr. Gilchrist is an official of the new chemical company.

Fire, Feb. 17, destroyed a portion of the plant of the United States Cast Iron Pipe & Foundry Co., North Birmingham, with loss estimated at \$50,000, including equipment. It is planned to rebuild. Headquarters of the company are at East Burlington, N. J.

Canada

TORONTO, Feb. 25.

MACHINE tool business has been making steady progress, and sales the past week or two have reached a larger volume than those of the earlier weeks of the year. Inquiries for equipment are appearing more frequently and dealers handling woodworking tools and machinery have received a large number of promising inquiries, with sales well up to expectations. Iron and steel working tools are also in strong demand, and the placing of orders for railroad equipment is being reflected in a stronger demand from car building companies. The automotive industry is furnishing a good part of the business and it is reported that inquiries are out for new works as well as for a considerable volume of tools for replacement purposes.

The Oxford Foundry & Machine Co., Oxford, N. S., is having plans prepared for a machine shop to replace one recently destroyed by fire and is interested in equipment.

It is stated that the St. Regis Paper Co. of Canada has awarded the general contract for the construction of a power development plant at Godbout, Que., to the Canadian Comstock Co., at a cost of \$100,000. The contract includes installation of water wheels, generators, penstock, transmission lines, pumps, motors and electric distributors.

The Bickle Fire Engine Co., Woodstock, Ont., is having plans prepared for an addition to its plant on Yonge Street, and proposes to start construction work soon.

The Harmer Knowles Trucks, Ltd., Wagstaff Drive, Toronto, is preparing to move its plant to the building of the Malleable Iron Works at Midland, Ont.

H. W. Matthews, divisional superintendent of the Canadian National-Wabash Railway, announced that new C. N. R.-Wabash Railway locomotive shops and roundhouse combined will be constructed in St. Thomas, Ont. Mr. Matthews stated that the appropriation for the new shops has been set at \$220,000 and that the construction would be made jointly by the Canadian National Railways and the Wabash Railway. It is understood that erection of the shops will start this spring.

Bids are being received by C. M. Borter, architect, 102 Main Street, Niagara Falls South, Ont., for an addition to the factory of the Niagara Wire Weaving Co., Robinson and

Buchanan Streets. Plans and specifications are with the architect. No closing date has been set.

Western Canada

The Canadian Pacific Railway Co. is having plans prepared for remodeling the power plant at Winnipeg. Construction work proposed will consist of a one-story brick addition to the boiler house and the replacement of dynamos, motors, and other power house equipment. J. C. Holden, Winnipeg, is district engineer.

The British Columbia Electric Railway Co. is building an addition to its substation at New Westminster, B. C., to cost \$6,500. It will house a 500-kw. rotary converter and other transformers and electrical equipment.

Spillers, Ltd., London, England, is having plans prepared for the erection of a \$2,500,000 jetty and grain elevator at Vancouver, B. C., adjoining the Ballantyne pier. R. H. Gale, Dominion Building, Vancouver, B. C., is the local representative of the company.

The Robin Hood Milling Co., Calgary, Alta., is having plans prepared for a \$250,000 addition to its flour mill. The improvement will include an addition to the power plant, installation of new equipment and the construction of 10 concrete grain storage tanks.

STEEL AND INDUSTRIAL STOCKS

The range in prices of active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	45	47 1/4	Int. Har.	84 1/2	86
Allis-Chal. pf. . .	95	95	Int. Har. pf.	108	108
Am. B. S. & Fdy. 77 1/4	77 1/4	77 1/4	Lima Loco.	64 1/2	65 1/2
Am. Can.	110 1/4	115 1/2	Midvale Steel ..	31	31 1/4
Am. Can. pf.	112 1/4	112 3/4	Nat.-Acme	8 1/4	8 1/2
Am. Car & Fdy. 161 3/4	161 3/4	165 1/2	Nat. En. & Stm. .	29 1/4	35 1/4
Am. Locomotive. 71 1/4	71 1/4	74	Nat. En. & S. pf. .	85	85
Am. Loco. pf.	119	119	N. Y. Air Brake 38 3/4	40 1/2	41 1/2
Am. Radiator ..	100 1/4	102 1/4	Otis Steel	10 1/4	11 1/4
Am. Steel Fdries. 37 1/4	38 1/4	38 1/4	Otis Steel pf.	67 3/4	71
Am. Stil. Fd. pf. 103 1/4	103 1/4	103 1/4	Pressed Steel Car 54	56	56
Bald. Loco.	118 3/4	123 1/4	Replorie Steel ..	11	11 1/4
Beth. Steel	55 1/4	58 3/4	Republic	54 1/2	57 1/2
Beth. Stil. 7 1/2 pf. 95 1/4	95 1/4	95 1/4	Sloss-Sheffield ..	58	63
Beth. Stil. 8 1/2 pf. 109	109	109 1/2	Sloss-Sheffield pf. 84	84	84
Br. Em. Steel... 5	5	5	Steel of Canada. 75 1/4	76 1/2	76 1/2
Br. Em. Stil. 2 pf. 15 1/4	15 1/4	15 1/4	Un. Alloy Steel..	34 1/4	35
Chic. Pneu. Tool 81 3/4	81 3/4	81 3/4	U. S. Pipe	65 1/2	71
Colo. Fuel	25 3/4	28	U. S. Pipe pf.	85	85 3/4
Crucible Steel ..	61 1/4	65 1/4	U. S. Steel	102	105 1/4
Deere nf.	70 1/4	72	U. S. Steel pf.	119 1/4	119 1/4
Gen. Electric ...	205 1/4	212	Vanadium Steel. 29 1/4	31 1/4	31 1/4
Gt. No. Ore Cert. 28 3/4	28 3/4	29 3/4	W'house Air Br. .	90 1/4	92
Gulf States Steel 79 1/4	83 1/4	83 1/4	Y'gstown S. & T. 69	69	69

Baldwin Locomotive Earnings

The Baldwin Locomotive Works reports the largest gross business transacted since 1918, gross sales aggregating \$102,762,075, against \$33,087,259 in 1922 and \$123,179,252 in 1918. Operating income last year was \$10,184,755, the third largest on record. After charges and preferred dividends, there was a remainder equivalent to \$25.58 per share on the \$20,000,000 common stock outstanding. The balance sheet as of Dec. 31, 1923, showed net current assets of \$51,862,022 against \$9,521,954 in the preceding year. Profit and loss surplus at the end of 1923 totaled \$19,847,242, against \$18,930,777 on Dec. 31, 1922. President Samuel M. Vauclain said to stockholders "Business during the year has been very satisfactory. Four workshops have been properly maintained and improved and are fully prepared for such business as may offer during the year 1924."

Gross earnings of the Pressed Steel Car Co. for 1923 were \$2,799,973 after payment of taxes. The income account as published Feb. 6, showed a balance of \$331,861, equivalent to \$6.65 per share on the \$12,500,000 of common stock outstanding, after depreciation, preferred dividends, etc., as compared with a deficit in 1922 of \$1,216,688.

New Plans to Finance Industrial Buildings

Simplification of industrial finance, as it pertains to structures for manufacturing and warehousing, by eliminating the obstacle of first cost, is announced by the Blaw-Knox Co., Pittsburgh. The new plan puts the purchase of buildings for every use on a "pay for them as they earn for you" basis.

Factories, machine shops, commercial garages, warehouses—all may now be had on this new basis which minimizes building investment and releases maximum funds for active use where they can multiply.

Extended payment plans have been applied to automobiles, household goods, etc., to the benefit of the public at large. To apply these fundamentals to manufacturing buildings costing from \$1,000 to \$50,000 is the proposal of the Blaw-Knox Co.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

Bars:	Per Lb.
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base....	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base.....	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.
Steel plates, ¼ in. and heavier	3.64c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger.....	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger).....	4.10c.
Toe-calk, ½ x ¾ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard.....	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex.....	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten.....	75c. to 80c.

Sheets

No.	Blue Annealed	Per Lb.
No. 10		4.34c.
No. 12		4.39c.
No. 14		4.44c.
No. 16		4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.60c.
Nos. 22 and 24	4.70c. to 4.75c.	5.10c.
No. 26	4.75c. to 4.80c.	5.15c.
No. 28*	4.85c. to 4.90c.	5.25c.
No. 30	5.05c. to 5.10c.

Galvanized

No.	Per Lb.
No. 14	4.95c. to 5.00c.
No. 16	5.10c. to 5.15c.
Nos. 18 and 20	5.25c. to 5.30c.
Nos. 22 and 24	5.40c. to 5.45c.
No. 26	5.55c. to 5.60c.
No. 28*	5.85c. to 5.90c.
No. 30	6.30c. to 6.35c.

*No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel		Wrought Iron	
Black	Galv.	Black	Galv.
½ in. Butt... —41	—24	½ in. Butt... —4	+19
¾ in. Butt... —46	—32	¾ in. Butt... —11	+ 9
1-3 in. Butt... —48	—34	1-1½ in. Butt... —11	+ 6
2½-6 in. Lap... —44	—30	2 in. Lap... —5	+14
7-8 in. Lap... —41	—11	2½-6 in. Lap... —9	+ 9
9-12 in. Lap... —34	— 6	7-12 in. Lap... —3	+16

Bolts and Screws

Machine bolts, cut thread,	45 and 10 to 50 and 10 per cent off list
Carriage bolts, cut thread,	35 to 35 and 10 per cent off list
Coach screws	45 to 50 and 10 per cent off list
Wood screws, flat head iron,	75, 20, 10 and 7½ per cent off list

Steel Wire

	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 18¼c.
High brass wire	18¼c. to 19¼c.
Brass rods	15¼c. to 16¼c.
Brass tube, brazed	25¼c. to 27¼c.
Brass tube, seamless	22 c. to 23 c.
Copper tube, seamless	23 c. to 24 c.

Copper Sheets

Sheet copper, hot rolled, 20½c. to 21c. per lb. base.
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade	Grade	Coke—14 x 20	Prime	Seconds
	"AAA"	"A"			
	Charcoal	Charcoal			
	14x20	14x20			
IC..	\$11.75	\$9.50	80 lb..	\$6.55	\$6.30
IX..	13.25	11.50	90 lb..	6.65	6.40
IXX..	14.50	12.50	100 lb..	6.75	6.50
IXXX..	15.50	13.75	IC..	7.00	6.75
IXXXX..	16.50	14.75	IX..	8.25	8.00
			IXX..	9.50	9.25
			IXXX..	10.75	10.50
			IXXXX..	12.00	10.75

Terne Plates

	8 lb. coating, 14 x 20
100 lb.	\$7.00 to \$8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	62c.
Bar	68c. to 70c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14 c.

Spelter and Sheet Zinc

Western spelter	8c.
Sheet zinc, No. 9 base, casks.....	10¼c. open 11¼c.

Lead and Solder*

American pig lead	10c. to 11c.
Bar lead	14c. to 15c.
Solder ½ and ½ guaranteed	39c.
No. 1 solder	37c.
Refined solder	33c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.....	75c. to 90c.
Commercial grade, per lb.....	35c. to 50c.
Grade D, per lb.....	25c. to 35c.

Antimony

Asiatic	13c. to 14c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.....	36c.
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Old Metals

The market is sluggish and business quiet. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.50
Copper, light bottoms	9.00
Brass, heavy	6.25
Brass, light	5.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	7.75
Lead, heavy	7.50
Lead, tea	6.00
Zinc	4.00
Cast aluminum	17.00
Sheet aluminum	17.00